

In This Issue—*The Ghosts of Motor Row*

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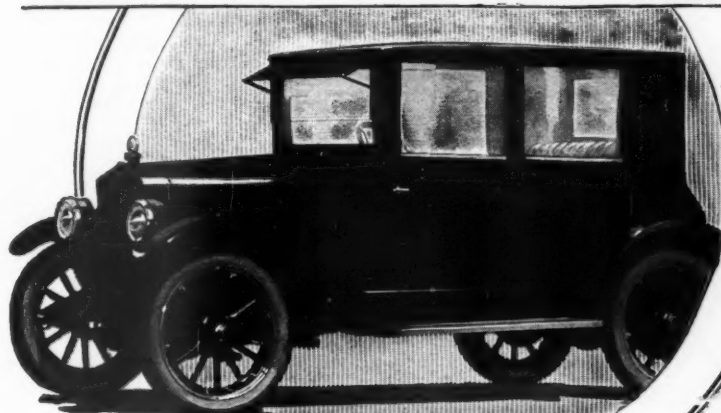
# MOTOR AGE

Vol. XLII  
Number 17

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, OCTOBER 26, 1922

Thirty-five Cents a Copy  
Three Dollars a Year

## ESSEX COACH \$1245



## Sell a Car That Sells All Winter

The Essex line means active business all year 'round. No need to store a lot of cars through the winter. That is the season when the Coach and the Cabriolet are most wanted. They give closed-car comfort at almost open-car price.

Essex builds but one other model — the touring. Thus dealers need not invest in a large variety of models. No slow sellers to load up on. That is why Essex dealers are making money

—and will continue to make money all winter.

Nothing like the Coach sales has ever been experienced in closed-car marketing. For no other closed car gives what it does—utility and comfort for all weather—the reliability and performance of a famous chassis—a price advantage of from \$500 to \$800 over cars of comparable qualities.

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Touring, \$1045

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Coach, \$1245

Freight and Tax Extra

**ESSEX MOTORS—DETROIT, MICH.**



# NO-LEAK-O

## Piston Rings



### As Business Builders

National advertising in the Saturday Evening Post has made the motoring public familiar with No-Leak-O Piston Rings and the fact that "they Won't Leak Because They're Sealed With Oil." Their exclusive "oil-SEALing" groove means to the motorist real SAVING. This groove packs an oil film in between piston and cylinder walls which seals in all expanding gas, absolutely prevents "oil pumping," gives *oil control and compression in each individual ring*, and prevents "unburnt" gas or kerosene from leaking down into the crank case to weaken lubrication.

No-Leak-O Piston Rings are made in one piece—easy to install—quick seating—of finest material—guaranteed against breakage—individually tested for accuracy—and give equal tension on the cylinder walls.

The Nation's standard replacement ring.

Over 200 reliable jobbers carry No-Leak-O in standard sizes and over sizes. Prompt service *always*.

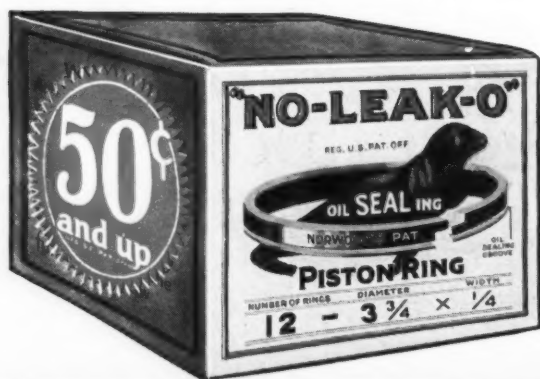
Write for free booklet, "Know the Facts About Grooved Piston Rings." Also let us tell you about our liberal dealer proposition and how our National Advertising can increase your profits. Quick action on your part will mean bigger profits.

#### NO-LEAK-O PISTON RING COMPANY

Dept. T-31  
Baltimore, Md.

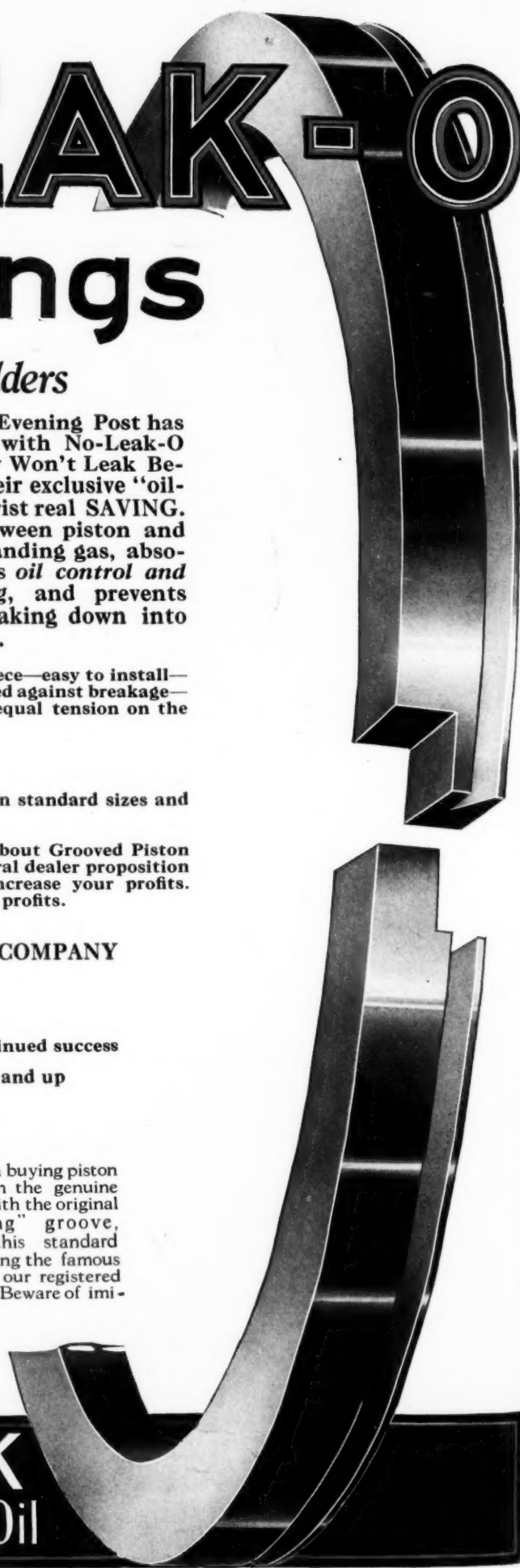
On price during eight years of continued success

One design—for all cars—50c and up



*Important*—In buying piston rings insist on the genuine No-Leak-O with the original "oilSEALing" groove, packed in this standard package bearing the famous ring and seal, our registered trade mark. Beware of imitations.

**WON'T LEAK**  
because they're sealed with Oil



# MOTOR AGE

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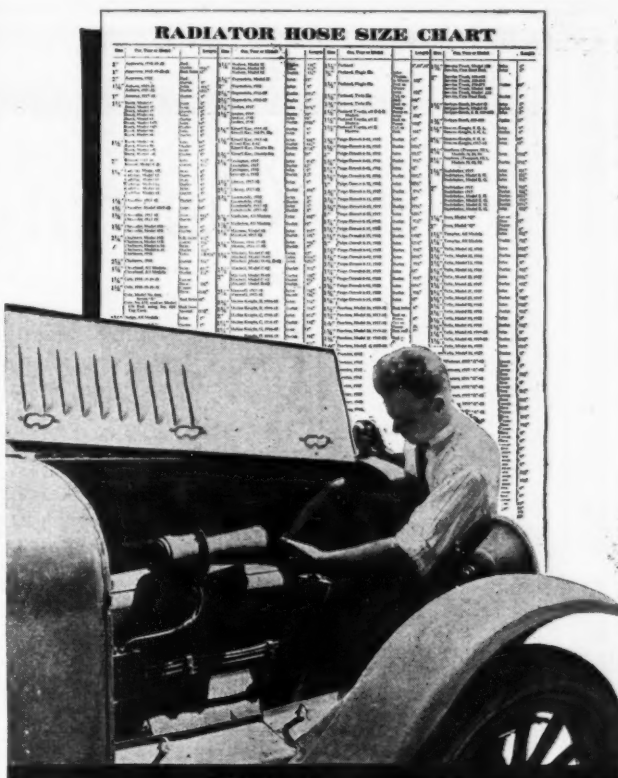
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## RADIATOR HOSE SIZE CHART



## RIGHT to the thousandth of an inch

No matter what make or model of passenger car or truck drives up to your door for radiator hose you can supply instantly the right size and length if you sell GOODRICH.

GOODRICH furnishes all garage dealers and accessory stores featuring its radiator hose with an elaborate though easily followed chart showing just the width and length to apply. You can not go wrong. You do not waste your time fussing and measuring. You do not waste hose in cutting and recutting. Look at the chart—the job done right.

And more—

*You sell hose that will do the job better and last longer—AND BRING A SATISFIED CUSTOMER BACK TO YOU!*

THE B. F. GOODRICH RUBBER COMPANY  
 Akron, Ohio

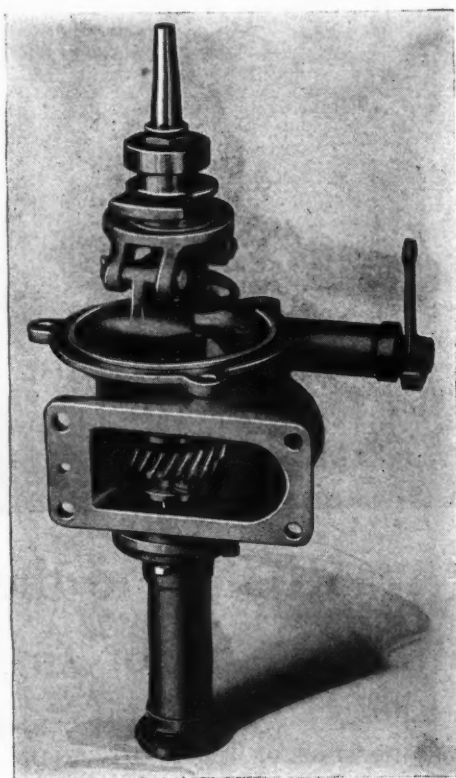
# Goodrich

## RADIATOR HOSE

"BEST IN THE LONG RUN"



## The Centrifugal Governor



is a unique feature effecting the control, and economy of operation, of the Rolls-Royce Motor Car. When the Governor lever on the quadrant is set to any given position it automatically controls the maximum speed at which the engine will develop power (without the use of the accelerator pedal.)

Thus, when the car is running at speeds higher than that for which the Governor is set, the throttle will close, when the accelerator pedal is released, but, at lower speeds it will remain open

When the car descends a hill, at, say 20 miles an hour, with the Governor lever set at 15 miles an hour, the throttle is held automatically closed so long as the speed exceeds 15 miles an hour. This results in a marked saving of fuel and avoids popping in the exhaust when descending hills. This is one of

the features which contribute to the unusual economy of Rolls-Royce cars, enabling them to do from 11 to 14 miles to the gallon of gasoline.

# ROLLS-ROYCE

*No Rolls-Royce has ever worn out*

When starting from rest there is no need under any conditions to race the Rolls-Royce engine, because, as soon as the clutch is let in, and power demanded from the engine, the throttle is automatically opened wide by the Centrifugal Governor and the engine caused to develop its maximum power and speed at which it is set.

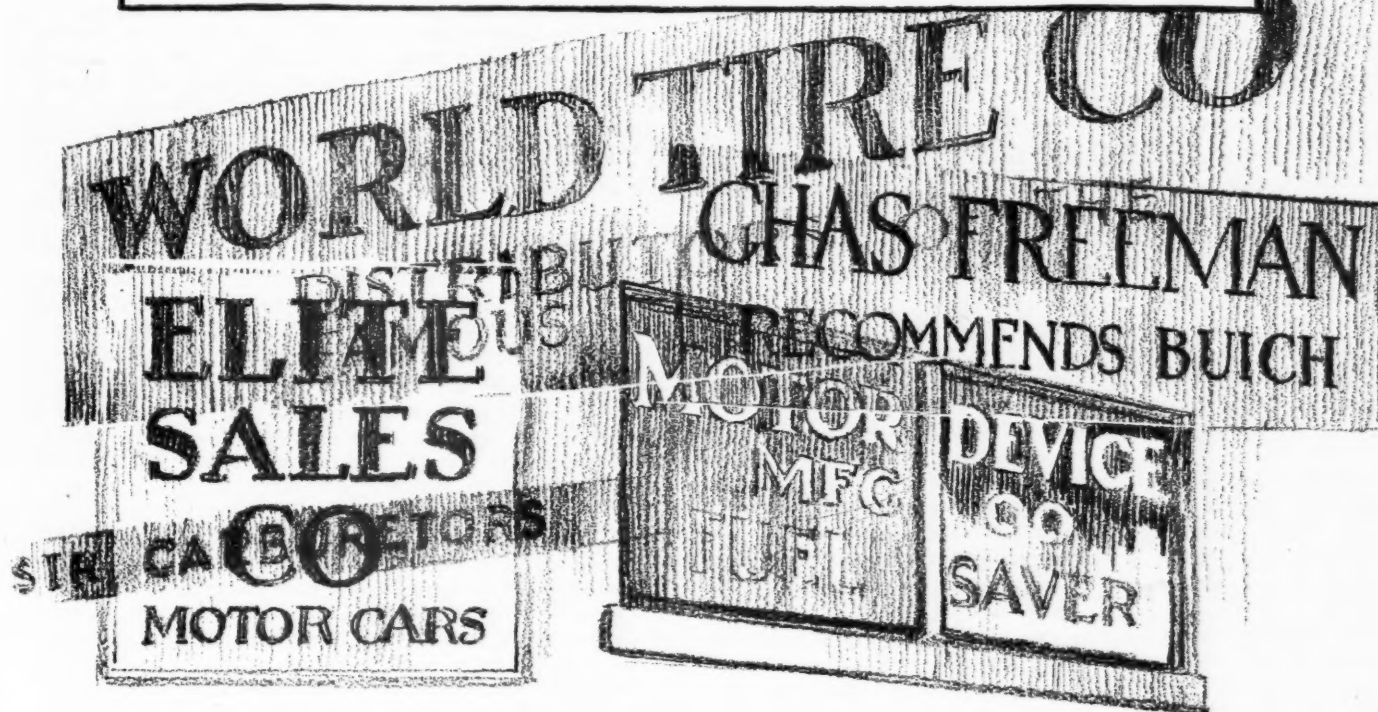
Write for "The Story of  
Rolls-Royce—Its Design,  
Workmanship and Materials"

**ROLLS-ROYCE**  
SPRINGFIELD, MASSACHUSETTS

Visitors Are Always  
Welcome at the Works



# MOTOR AGE



## The Ghosts of Motor Row

*Have you Ever Analyzed the Failures to See if Any of Their Business Faults  
Are a Factor in Your Own Failure to Succeed*

By CLYDE JENNINGS

**H**AVE you ever walked along a Motor Row in a large city on Sunday morning, or some other time when not many people were in your way, and you could observe at will, look as long as you liked and study what appeared to be worth studying?

This is recommended as an interesting investigation for anyone who is familiar with the good and bad ventures in the automotive industry during the recent years. It is during and after such an observation test as described

that one realizes the number of "Ships that Pass in the Night," and then, too, one realizes why our forefathers perpetuated the ghost stories that are handed down to us. There are so many ghosts represented here and there on the windows, the blank walls and in the locations that are familiar to you as the homes of far different enterprises from those of the newcomers who now occupy them.

What do these old signs mean to you? Did you ever

study them and let your thoughts go back over the history of the firms, which placed them there and pick out the flaw in the scheme of doing business.

A memory is like a library. It has only one use, and that is reference. We all know so much—or have known so much—that could not be written into the library and indexed in a printed volume, that the mind was supplied with a library in the form of memory. In thinking over these old signs, some almost obliterated by weather, some with just an odd corner left by a new sign, and some still traceable on a window because the building has fallen in caste and the new occupant has not bothered about removing the traces of the evil spirit of older days—it is necessary to use the printed library as well as memory.

As you stand there on one of the bright fall Sunday mornings, when the sky is clear, the sun warm and the breeze cool, other falls are recalled. You see behind the windows the shadows of men whose temporary success made you doubt the fundamentals of business. It is the same everywhere, so it is not necessary to locate this story. It will do in your city just the same as in the city where the observations were made. After all, there is only one difference in cities; "mine" is always the best city and "yours" is next. There are the same kinds of people in mass, and the same kinds of ventures are written into the failures.

Your eye catches a sign. In this case it is a tire company sign.

### *Two Mistakes of a Tire Company*

This sign is particularly interesting. This firm with a new brand of tire, with no factory address but a very unusual catalogue and broadside, came into the field to entirely reorganize the tire business.

Mistake No. 1 was the revolutionary idea begun on a basis that set everybody to wondering how such a revolutionary plan could succeed against the large organizations and how men with such profitable ideas could have escaped joining the bigger organizations that wanted so badly to dominate the tire market.

Mistake No. 2 was locating this business in the midst of the conservative automotive district. Every victim lured to the office had to pass many legitimate places of business and many were prone to inquire. The place was closed when the promoters were arrested. The ending of the case did not attract much attention.

On a back wall across the street are the remnants of a sign that years ago proclaimed the leading dealer in a car that was then a so-called leader. The story is quickly told. This dealer was a salesman, a graduate of a stock selling organization. He had but one interest in life, to sell new cars. He never did equip a shop to care for these cars and the factory never urged him to do so. Two years was a long life for this institution and the owner is lucky to be still selling cars.

On the upper windows of a nearby building are traces of a sign that once proclaimed the home of a company, organized for a few millions, that had a device that would enable gasoline engines to burn any sort of fuel and go three or four times as far on the gallon. The engineer who discovered this amazing device was never previously heard of in automotive circles. His name is now recorded only in the circulars his company printed. His device was never used and the stock that was sold never paid a dividend. The waste was terrific in this venture.

### *The Dealer With Many "Favorites"*

Across is a dealer, still going full steam ahead and his handsome salesroom apparently shows his prosperity. He is not praising the same car that he was praising when we were here some time ago. He is a good salesman, a good organizer and he always makes an honest endeavor to properly maintain the cars he sells, while he is selling that car. But he is like the salesman in the comedy in "Six Cylinder Love." He always has a new favorite, unless you are on his confidential

list and then he tells quite freely about his really favorite car and perhaps it is the one he sold ten years ago.

The reason you learn after while that he is not selling this car is that the office of that particular factory used to be filled with "dubs" and they would not listen to him. He was, you gather, a splendid co-operator as long as the factory did exactly what he wanted done, but when it came to a compromise, he would not give an inch, because he was always right.

Strange to say these "dubs"—at least the description of them sounds so much alike that you are forced to believe they are the same—moved over to another factory about a year after he took its cars on as a new line. These "dubs" are a movable lot for they have confronted this man at least a half dozen times and now they are getting a foothold in the factory of his latest favorite.

It is strange how anxious the average man can be to have a new sign painted and how uninterested he is in painting out the old one. This man is one of those peculiar individuals who likes to paint out the old sign with a new one and the bricks on his building must have a dozen layers of paint to protect them. There is one distinct advantage to this changing of lines, the signs always look fresh and nice. His place looks like prosperity but his credit rating tells a different story.

### *And One Who Avoided Mistakes*

As we wander a bit farther down street we see a sign in electric lights that serves as a shock to a degree that might make you suspect that the insulation had been worn from some of the wires and the current reached you. Where have we seen or heard that name before?

It requires some investigation and finally, a doorway down the alley is a reminder. This man once had an electrical shop down there. He was often called an "alley rat." He did not owe allegiance to any one and none apparently wanted to claim him. He bought his supplies where he could, but his work, which he did himself, or had done under his direct supervision, until such a time as he could train mechanics, was the sort that brings customers back to the shop. After a while it became notable that much electrical work was drifting past the dealers' maintenance departments to this shop in the alley. His account became one that many supply merchants solicited. He liked to use parts from the original factory and bought them when he could regardless of cost, but, when he was refused these parts, he used others or made parts in his own shop. He told his customers why he made these parts or used something besides originals, and he told them that the substitute parts were equally good.

He had built a reputation that made his word better with his customers than the recommendation of a far away factory, because his work always delivered the performance.

**A dealer can build with his own customers a reputation that will offset that of a manufacturer.**

**A repeat customer is the most profitable customer.**  
We might add another to this list and this is:

**A merchandising policy that is restrictive cannot succeed.**

After this man had proven these things, he used his capital to take over the dealership of a good car, which was in the hands of a man who did not believe in maintenance. He is prosperous and his cars are running up in the local registration list.

Across the street is another sign that has been changed. It requires quite a bit of memory effort to recall what dealer's name was there before, for the car is the same. Finally you recall it. He was once president of the local dealer association and a leader in many ways. He was a fine salesman, his office had all of the latest ticklers, card indexes and all of those things but his maintenance department was sadly lacking in equipment. Two vices, one of them broken, were the heaviest investment. He flourished for a time and then suffered a relapse.

During the time that this dealer was flourishing, he established several branch salesrooms. They were fine samples of architecture and of sales surroundings. But the back room



was vacant, or practically so. Such service as was extended, was on a happen so basis and sometimes it was overcharged but more often not charged for at all.

The present distributor, who inherited the wreckage of this distributorship, made his first investment in equipment for the maintenance department. Then he was ready to sell cars and he began. Despite the handicap of previous reputation, he has gained steadily. After he had a sales organization functioning, he sent out a maintenance salesman. This man drove a very old car and it was in very fine condition. He stopped drivers of his make of car wherever he found them and asked why they were not bringing their cars to the official dealer maintenance department. He assured them of honest, flat rate prices, good materials and honest workmanship and courteous treatment. This maintenance salesman had a list of the licenses issued to his make of car and he made house to house calls. He doubled the volume in the maintenance department in two months. After five months he had 80 per cent of his list of cars in the district on record at the shop. The car sales resulting from this campaign paid for the cost of the maintenance salesman.

Then the branch salesrooms were revived. But each opened as an official dealer maintenance station and the salesroom was added after the maintenance station was under way. This new distributor is prosperous and he is firm in his belief that maintenance is the best lead to sales.

Just across the street is one of the pioneer automobile sales buildings. It was considered a very handsome building in its day and one of its first occupants was a dealer who made an almost national reputation by his advertising performance. He seemed to mistake publicity for advertising and he did not distinguish between the methods which made Mr. Wrigley's chewing gum famous and those suitable for selling his high priced automobile.

#### *Chewing Gum Ads for High Priced Cars*

His mistake, apparently, was in thinking that if he put the name of his car on everyone's lips that they would wander into an automobile store and while making up their mind what car to buy would name the brand that he sold.

The crash was terrible and some people are still wondering why he crashed. He, perhaps, is more to be pitied than censured, as many automobile manufacturers have made the same mistake and some are still making it. Apparently they believe that all that is necessary is to get the name of their product before the public and the public will buy it regardless. They forget that transportation merchants do not stock a certain brand of cars, running from \$3,600 to \$60,000 a dozen, as other merchants stock chewing gum, selling wholesale at 60 cents a carton, with a possibility of 20 sales at 5 cents each.

On the outskirts of Motor Row is a building that has many ghosts in its often vacant rooms and its now dark corridors. Once this building was quite the smartest office building on the Row but it has fallen into evil days as the ghosts and dust have multiplied.

Notable among the departed tenants have been those who wished to make a device that would solve most of the troubles of the owner of an old car, those who sought to make cars into trucks, or to make cultivators out of tractors, or tried to develop some other duplicate purpose idea, for some machine that was built for one purpose.

In cases where the idea was a good one, these institutions flourished for a time and then went into the discard because the vehicle manufacturer brought out the same thing. In nine cases out of ten this end to the business had not been foreseen and the crash was equal to that of a fake device.

Strange as it may appear, most of the inventors who really invent something good would rather go into business for themselves than to sell their ideas to a manufacturer who already is in the business and has a sound and growing proposition. These inventors and their amateur advisors always assume that they have the entire right to the idea and they fail to take cognizance of the fact that some other genius will do the same thing in a different—and often a better—way. Thousands of good devices and ideas have gone into motor vehicles by this route. If the inventor had played with the manufacturer at the start, he would have had a chance. But as an independent, he was crushed and his friends who supported him fell with him.

There are but three primary causes of business ghosts:

- 1—Incompetency.
- 2—Dishonesty.
- 3—Building for permanency on an unstable market.

Too many people regard incompetency solely as dullness, a failure to reach the proper vision of opportunity. It can be just as well applied to the man who over reaches and to the man who is unable to differentiate between vision and imagination. The man who over advertises is just as incompetent as the man who does not advertise.

The same is true of the man who has a perfectly good idea or device and who believes that because he has a good thing, the public will buy it. Some automobile manufacturers have believed this and more dealers have acted on this principle.

The whole idea is wrong. The public will not buy until it is asked to buy and then it must be told why it is to buy. The sale of an article is often more important than the article that is to be sold. This is in evidence in every automotive dealer's conversation. Every dealer who talks of vehicles generally mentions at least one that "was a wonder but never sold well." The reason is that the selling was not properly promoted and organized.

Many a dealer is making good with a car today while the man across the street with more vehicle for the money is slowly going broke, because the dealer with the inferior vehicle is making an intelligent and honest sales effort.

Honesty in the automotive sales business means service, stability and all of those things. Give the three items mentioned above a broad definition, act accordingly in both selection of your merchandise and your sales methods and your sign will never be one of the ghosts that haunt Motor Row.





## Dort Joins the Six Cylinder Class

*New Engine for Complete Line of Six Models.  
Chassis Practically Unchanged*

**O**N the Dort 1923 models a new six-cylinder engine has been adopted to replace the old four-cylinder powerplant.

Outside of changing the radiator and hood, the chassis remains practically the same as the former model. The hood of the six has been rounded and a rounded nicked radiator has been substituted for the former one.

Regarding the car, the chief features are a wheelbase of 115 in.; semi-elliptic front springs, cantilever rear springs; 31 by 4 in. cord tires; barrel-type headlamps; spiral-bevel gear-driven rear axle; multiple disk clutch; wood wheels, with disk wheels optional, but extra; Bosch ignition; Timken and Hyatt bearings, full crown fenders and nicked door handles and foot rest.

It is stated that the tire mileage is 15,000 miles and that 24 miles per gallon of fuel have been obtained. The car is said to have a speed range of from 2 to 60 m.p.h. and acceleration from 5 to 25 m.p.h. in less than 9 sec.

The new six-cylinder engine is an overhead poppet type,  $3\frac{1}{4}$  by  $4\frac{1}{4}$  in. bore and stroke respectively, giving a piston displacement of 195.06 cu. in. The compression ratio is 21.82 per cent, giving a compression pressure of 74 lbs. at 300 r.p.m. The overhead valve mechanism is inclosed in an aluminum case. The engine has many novel features, both as to design and construction and these will be taken up in detail.

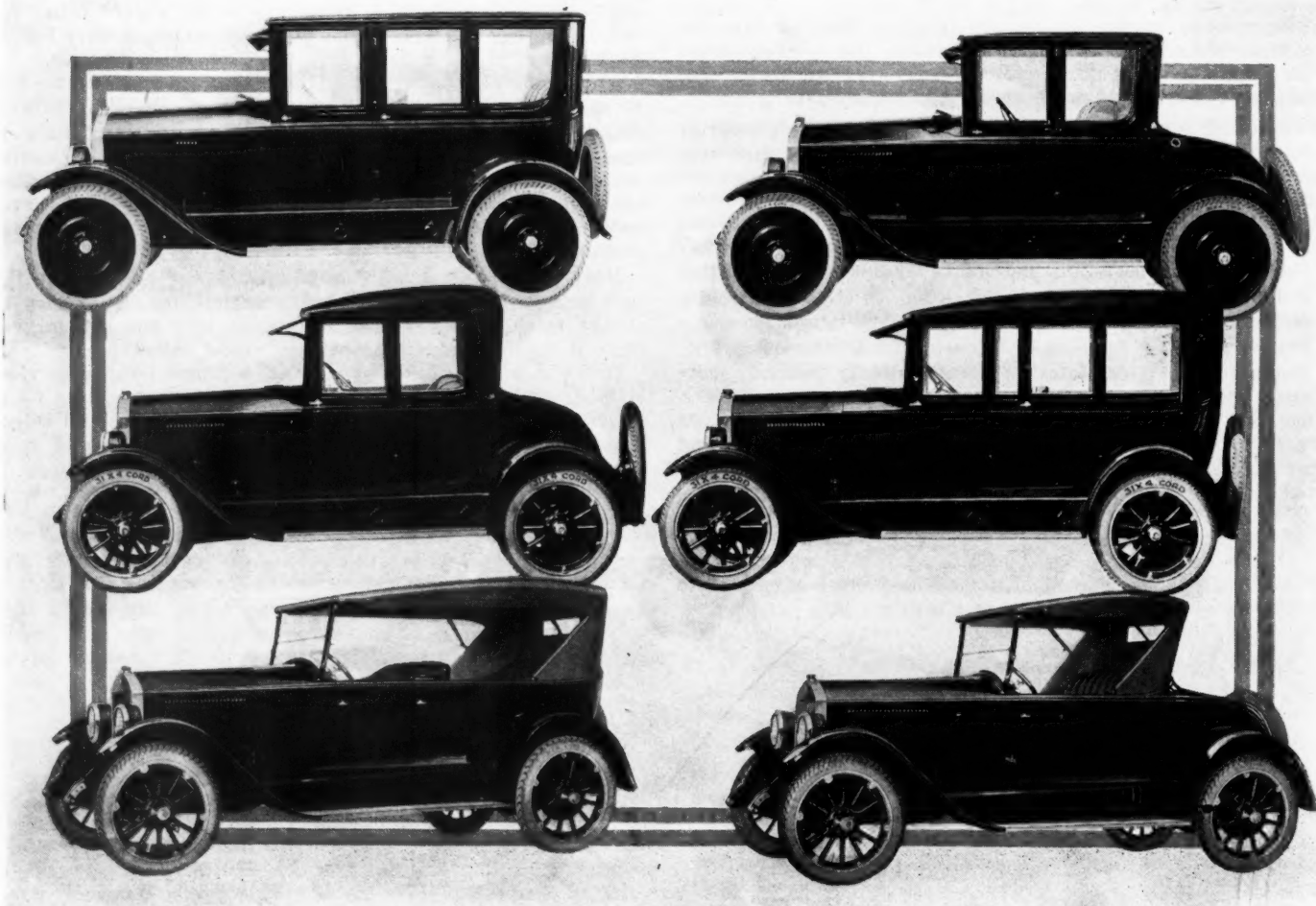
The cylinder block is cast of grey iron and final finish of the bores is by grinding. Pistons are of thin grey iron, each weighing 19.5 oz. This piston has been made light by cutting down the amount of material without lessening the thickness of the head. The skirt is kept very thin which results in keeping the piston cool. Within the head are six radial ribs. Before assembly, each piston is weighed to within  $\frac{1}{8}$  of an ounce, to prevent vibration.

Piston pins are made of chrome nickel steel and taper-reamed on the inside,

making them thinner at the ends without decreasing the exterior diameter. Piston rings are concentric type, three to each piston. They are thinner than the ordinary ring, being only  $\frac{1}{8}$  in. and are made so because they not only cut down weight but seat more quickly.

### Connecting Rods and Bearings

Connecting rods are of I-beam section, length, center to center,  $8\frac{1}{2}$  ins., weighing 2 lbs. Connecting rod bearings are 1.997 ins. in diameter and 1.626 in. in length, steel-backed and babbitt-lined, the babbitt bonded to tin, and tin bonded to the steel. This gives bearings integral with the connecting rod and obviates not only the possibility of loosening but the necessity of scraping in bearings. The surfaces of these connecting rod bearings are unbroken. They are cylindrical surfaces and of the floating type. In fitting, they have a clearance of .002 to .003 in. This allows for a film of oil which is forced under pressure



The Dort line of 1923 models. The phaeton and roadster are shown at the bottom, while at the top is the Harvard sedan and coupe. The center group is the Yale coupe and Yale sedan. All have the new six-cylinder engine and nicked radiator

from the interior of the drilled crankshaft.

### Crankshaft and Bearings

The crankshaft is the three-bearing type dynamically and statically balanced. The feature of the camshaft is the large base circle of the cams—this design being employed in order to obtain a long, quieting curve which is very material in keeping down the noise in valve lifting. The mushroom end of the tappet operates on the face of this cam, and where the lift is very abrupt and sudden in other types of cams, valve chatter is the result.

The operation of this cam is gradual and quiet, particularly because both the cam and tappet are bathed in oil, which flows down the push rod from the overhead rocker arm movement, on down through the hollow tappet and comes out the center of the mushroom end through a hole drilled for that purpose, and spills directly on the cam face.

### Overhead Valve Mechanism

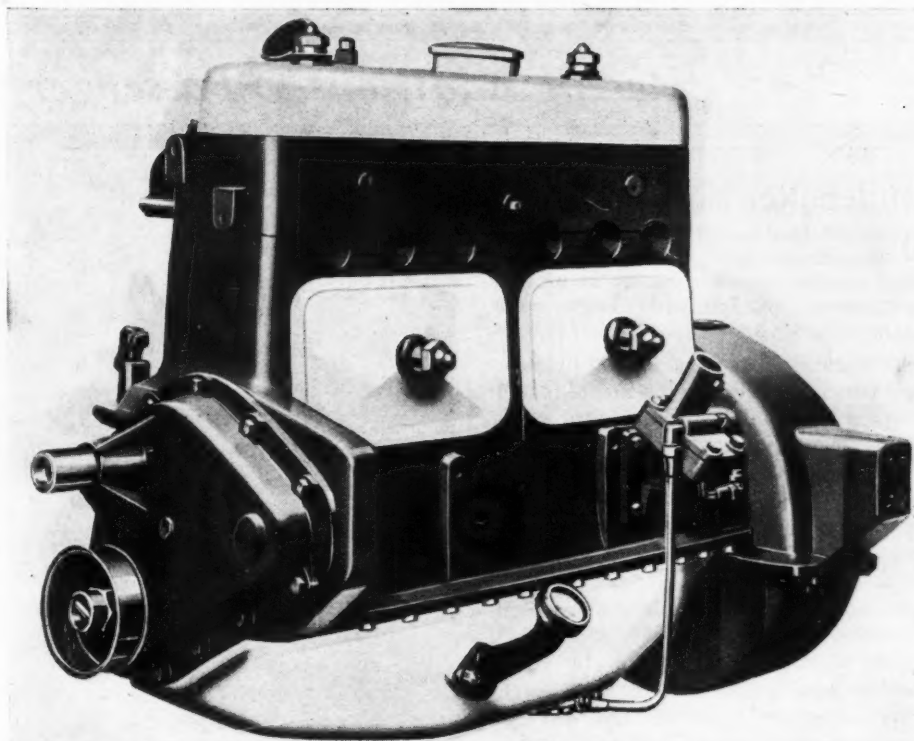
Two specific points in design have brought about quietness in the valve mechanism—lightness of its reciprocating parts and the liberal oil supply under pressure. The first eliminates noise by overcoming excessive inertia, and the second by cushioning contact surfaces with a film of oil.

The tappet rests with a free end in the bottom of the tubular tappet and thus gets rid of the side strain, and consequently undue wear on the exterior of the tappet, such as would occur if the push rod were solidly aligned with the tappet. The push rod itself is 5/16 tubular carbon steel, as light as it can be made consistent with strength. Its lower end rests on a small floating block in the bottom of the tappet interior. This little block prevents too great an amount of oil passing through and forces the excess to overflow over the upper rim, bathing the glazed outer surface where it works in a guide.

The top of the push rod ends in a cup in which the ball-end of the rocker arm operates. Oil flowing under pressure from the rocker arm shaft, through the drilled rocker arm comes out through a hole in the ball and into this cup. The ball, therefore, operates in a cupful of oil and a liberal film is always present to cushion the shock and reduce wear. This ball is adjustable from the top with a screw-driver and is held by a lock-nut. Rocker arms are drop-forged. They are mounted on the rocker arm shaft with bronze bushings which are slotted to pass the oil from the shaft under pressure through the arm to the ball and cup.

The valves, of the tulip type, are approximately 15 per cent lighter in weight than the ordinary mushroom type of the same diameter.

Crankshaft main bearings are bronze-backed and babbitt-lined, and are held in place by brass screws, the heads of which are bruised at the edges to prevent loosening. The front bearing is 2.10 in. long and 2 5/32 in. in diameter;



Clean exterior of the new Dort six-cylinder engine. The oil filler cap is on top. One of the chief features of this engine is the lubrication system and the method of varying the oil pressure with throttle opening

middle bearing 2 in. in length and 2 1/8 in. in diameter; rear 3 in. in length, 2 3/32 in. in diameter. The upper halves of these bearings are counter-sunk firmly in the upper half of the crankcase. In these bearings, as in connecting rod bearings, the babbitt surfaces are unbroken and of the floating type, accommodating the film of oil supplied under pressure through the crankshaft.

Exhaust and intake valves are the same in shape and size but different in material. The exhaust valves are made of chrome silicon steel with an alloy of about 88 per cent chromium for resistance to burning and pitting. Intake valves have a much lower percentage of the alloy because the heat resisting element is not so important. The ends of these valves where they contact with the rocker arms are hardened to resist wear. The stem is also properly hardened, ground and polished to operate in the cast iron guide block. The valve spring is made of vanadium steel.

### Cooling System

Thermo-syphon cooling is used through ample water jacket space and direct channels. A cellular Fedders radiator with a large top tank and a capacity for 5 gal. of water is standard equipment. An Automotive Parts fan dynamically balanced and belt driven controls the air circulation through the radiator.

### Lubrication

This engine has a full force feed lubrication system. An added advantage is a device which regulates the flow of oil to meet the need for lubrication as the need varies in accordance with the engine load. The oil supply is regulated in relation to the fuel supply, or in other

words, the throttle opening. It is easy to understand that when the load is heavy the throttle is at a wider opening, so the oil pressure is regulated by a lever connected with the throttle.

A gear pump located on the outside of the crankcase and on the same shaft with the distributor, both of which parts are operated from the timing gears, pumps oil from a specially designed, screen-enclosed well in the oil sump of the crankcase. The oil column is forced through the center of the crankshaft, drilled for the purpose, supplying lubrication to crankshaft and connecting rod bearings. Another lead carries oil to each of the camshaft bearings and to the timing gears. Still another lead carries a column of oil to the rocker arm shaft in the overhead valve mechanism. The oil flows under pressure through this hollow shaft and through holes matched by corresponding openings in the rocker arms and its bushings. The oil passes through the rocker arms to the valve stem end on the one side and on the other side, to the ball end which articulates after the manner of a ball-and-socket joint in the cup at the top end of the push rod.

Part of the oil supply overflows the cup and runs down its sides to the tubular tappet. Part of it flows through the drilled center of the tappet to where the lower end of the push rod sets in the bottom of the tappet like a lead pencil would set in an empty cartridge. The oil coming down the push rod fills the tappet in its guide and by passing through the hole in the bottom of the tappet through the mushroom base to directly lubricate the face of the camshaft. The oil then drops back into the crankcase.

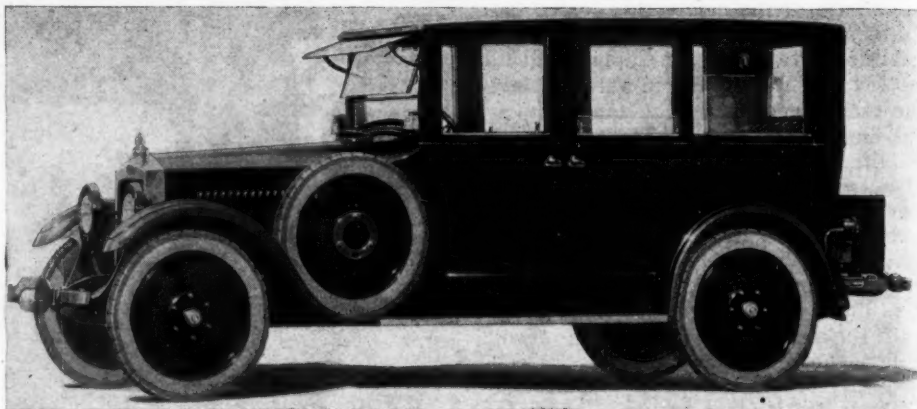


## Recent Additions to Passenger Car Lines

### Studebaker Sedan Special

ONE of the recent additions to the closed car field is the Studebaker sedan special, mounted on the 60-hp. big six chassis. The car is enhanced by such touches as the nickel-plated radiator shell, motometer and ornamental radiator cap. Other features are the nickel-plated bumpers front and rear, automatic windshield cleaner, rear-view mirror, spacious trunk, with dust-proof cover, at the rear, which is easily accessible because the two extra disk wheels, complete with tires and tubes, are carried on the front fenders.

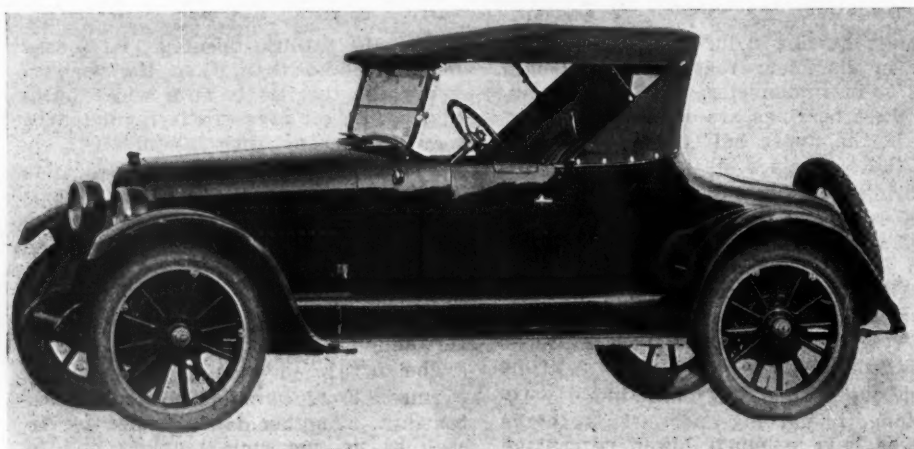
Among further features of comfort and convenience are the heater, thief-proof transmission lock, ventilator in cowl, massive headlights, artistic side coach lamps, courtesy light on the driver's side, opalescent dome light and corner



reading lights, automatic window regulators, silk roller curtains, three-piece rain-vision windshield, jeweled eight-day clock, door locks and door pockets.

Upholstery is of mohair velvet plush

with floor carpets, top lining and trimmings to match. Riding comfort is provided by the 9 in. deep cushions and the long semi-elliptic springs, 56 ins. in the rear and 38 ins. in front.



### New Nash Roadster

A NEW Nash roadster, in rich maroon and swung low to the road is an addition to the Nash line that has just been announced. An ecru silk mohair top sets off the body. Dark grey Spanish leather upholstery and trimming are used throughout the interior.

A new type ventilator is placed in the cowl, just forward of the one-piece windshield. The windshield bars are nicked, as is the radiator shell. Other refinements include new steering mechanism, oil klipp equipment, new barrel head-lamps, and parking lamps. Across the front of the chassis side members, is a bar that anchors the frame.

### Rolls-Royce Introduces New 20 hp. Model

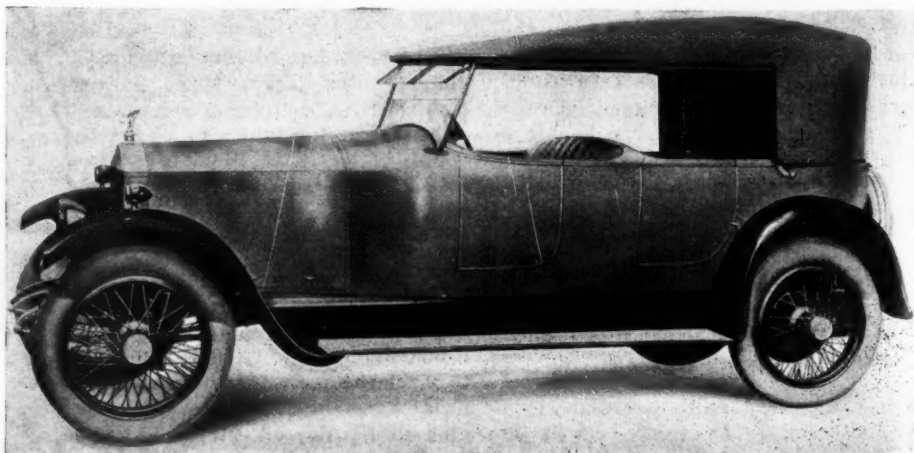
ROLLS-ROYCE has announced a smaller model to be built in addition to the large car. The small car has many of the large car characteristics, but the engine, a six, 3 by 4½ in., has overhead valves in place of the side valves. The engine has 190 cu. in. displacement and a speed range up to 3000 r.p.m. The car is rated at 20 hp. Springs are semi-elliptic, the rear being 54 in. long and taking both torque and drive.

The construction of the chassis parts is of the same grade which has characterized Rolls-Royce cars in the past. The engine as a whole is obviously an expensive job but in most other parts of the chassis there is nothing very costly about the design, though expense is not spared to provide an excellent finish.

This model is intended for open and

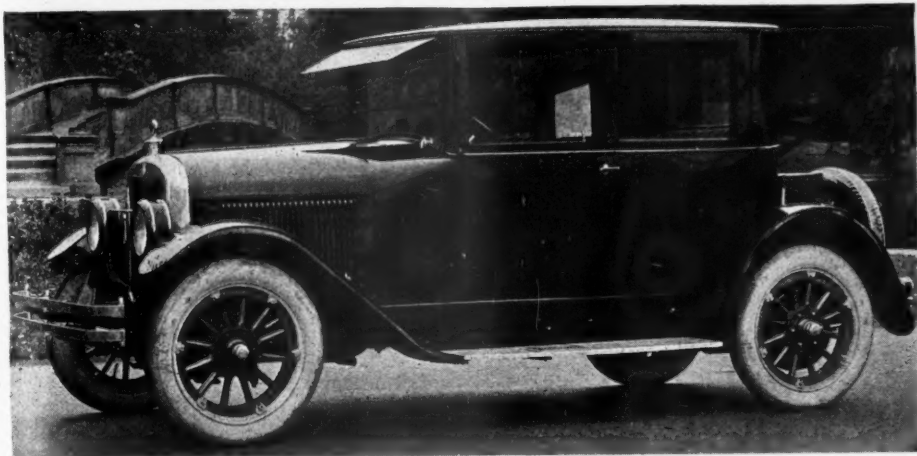
closed cars seating up to six people. The chassis weight is 2020 lbs. Some of the important dimensions are as follows: Wheelbase, 129 in.; track, 54 in.; length

of frame behind dash, 99 in.; length of frame to center of back axle, 90 in.; length over all, 178 in.; minimum ground clearance, 11 in.





## Two New King Closed Bodies



### Free Service

Giving free service in the automotive industries is becoming more and more a thing of the past, but in connection with the sale and servicing of batteries it is still quite customary for service stations to supply distilled water and also the labor necessary for putting it in the battery without making any charge for this work. This is done both on makes of batteries sold by them and on other makes as well. This practice, while not in accord with the present-day methods of doing business, has doubtless grown up for several reasons.

In the first place, the battery service station had an opportunity to test out batteries of other makes and occasionally an opportunity might present itself of making a sale where a defective battery was found. In the majority of cases, however, the time lost in providing this service added a considerable burden to the service station in the way of increased overhead and meant that the sale price of batteries and the cost of repair work had to be great enough to stand the additional strain caused by this free service.

Another possible reason for making no charge is that the value of the work is small and the dealer hesitates to make

a charge in proportion to its value, preferring to let the matter slide and consider the time lost as so much advertising. Another reason for this practice is that manufacturers of batteries have often expected their representatives to supply free service which, while proving advantageous from the manufacturer's standpoint, was unquestionably a hardship on the battery dealer.

To the average car owner the custom doubtless appears satisfactory, for unless he gives the matter careful analysis he will not stop to figure that the time must be paid for by someone, and as repairs and the sale of new batteries constitutes the only source of income, it is evident that the prices in each case must be higher to make up for the time lost on the free service.

For this reason, the conscientious car user who provides himself with a hydrometer, and checks and fills his own battery, is by this very system penalizing himself, for a new battery will cost him as much as it costs his neighbor who lets the battery station do all his work for him.

It should be evident, therefore, that both from the standpoint of the service station and from that of the car owner that a method of making nominal charges should be readily acceptable, and

TWO new closed bodies have been added to the King line. These are a sedanette and a seven-passenger sedan, on a chassis which is similar in all respects to the standard King chassis, except that it is 124 in. wheelbase instead of 120. Mechanically, the cars are the same as previously with the exception of the adoption of a ball bearing steering thrust bearing in the steering knuckle in place of the plain bearing. The axle is a Columbia, however, as previously.

In the fittings, the drum type headlamp has been adopted and parking lights of similar design as the headlamps are also part of the standard equipment. The fender lines have been altered somewhat to coincide with the exterior lines of the body, as illustrated herewith. The sedanette sells for \$1,995 and the seven passenger sedan for \$2,550.

the Universal Battery Company of Chicago has already adopted a policy of having their service stations make a charge of 15 cents for filling a battery with distilled water and 25 cents for filling, testing and cleaning of terminals. Another advantage which is brought out is that with this system it is possible to prevent tipping, with its demoralizing effect on employees, for the car owner will feel that he is paying what the service is worth and that a tip is unnecessary.

Another point in favor of the plan of charging for service is that prices on repair and sale of new batteries can be made in accordance with the demand of present-day business methods, and can be put on a fair competitive basis.

The exact method of handling any business is, of course, a thing that the manager must decide, and in the last analysis no one from the outside can dictate the policy to be followed. Accordingly, there may be cases where it would seem advisable to continue the practice of making no charge on minor service such as putting water in batteries, but the time so used should be accounted for at the end of the day, so that the shop manager will know just what his free service advertising is costing him. With this information he will then have a concrete basis on which to decide as to the advisability of the plan.

Note—A small bulletin on the question of charge for service may be had by writing the Universal Battery Company, 3410 South La Salle street, Chicago, Ill.

### AUTOMOBILE EXPORTS CONTINUE TO INCREASE

Exports of passenger cars in June increased 15 per cent over those of May, which in turn had gained 5½ per cent over the previous month. Truck exports gained 36 per cent in May over the preceding month, but fell off slightly during June.

## New Miami Special Fordson Trailer

THE constantly increasing use of the Fordson Tractor in commercial hauling and other industrial work has created a demand for special hauling equipment designed to be used with it. To meet this demand, the Miami Trailer Co., Troy, O., has just announced a new special Miami Fordson trailer.

This trailer is of all-steel construction except wheels and tires. It has a rounded load capacity of 2 yds., with provision for mounting a separate flared top box of  $\frac{1}{2}$  yd. or 1 yd. extra capacity for transporting materials of a total load of  $2\frac{1}{2}$  tons, but of greater volume than 2 cu. yds. With ample factor of safety, the carrying capacity is  $2\frac{1}{2}$  tons.

The body, which is of 10 gage steel, well reinforced with heavy angle arms, is designed with a rear bottom dump door, so that the size of the opening may be controlled either to dump the entire load in one spot, or to spread the contents 60 in. wide to any depth desired. The entire load dumps back of the axle and behind the wheels of the trailer. The load is practically balanced on the axle, sufficient weight being placed on the drawbar to prevent wear in the hitch connection. The special automatic hitch bolts on the rear housing of the tractor. The Fordson is simply backed up to the end of the trailer drawbar and the coupling is completed without pins or cotter keys. Only a slight upward pull on the drawbar is necessary to disconnect the trailer from the tractor.

Both release and winding levers of the



trailer are placed at the right hand of the tractor driver. This eliminates the necessity of stopping to dump or spread the load, or to rewind the dumping door. Such flexibility of operation greatly reduces ton mile costs, it is claimed.

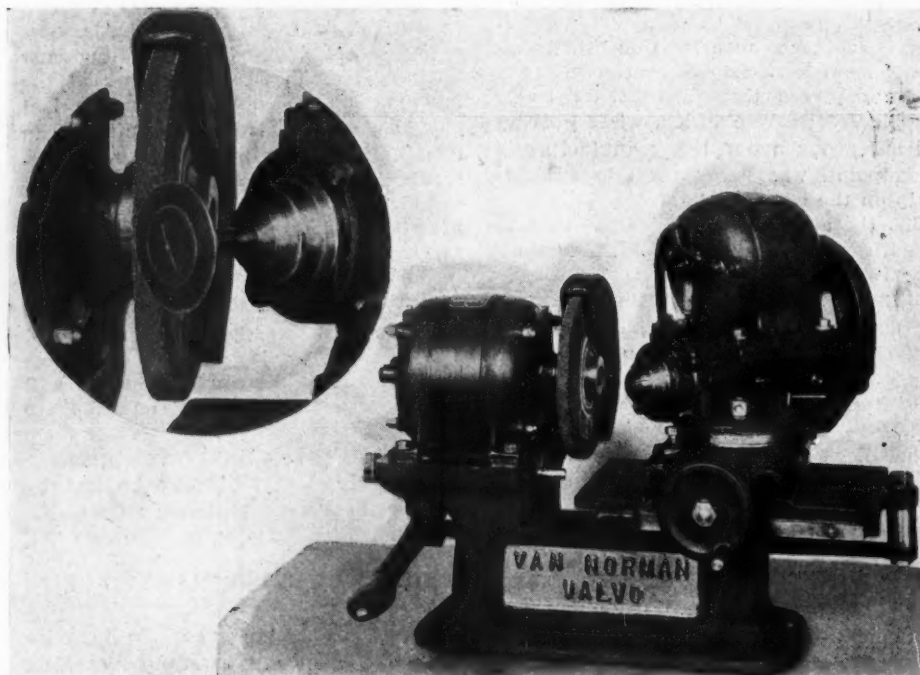
The turning radius is that of the Fordson Tractor. The unit can be backed into any position or can be turned around easily on the sub-base of a road. This flexibility is important for operation in close places.

Specifications are as follows:

Track .....60 in.

Axle 5 per cent nickel..... $2\frac{1}{4}$  in. sq.  
Bearings .....Timken roller  
Wheels artillery .....36x5 in.  
Tires pressed on .....36x5 in.  
Springs .....  
.....42 in. long, 3 in. wide, 11 leaves  
Frame rolled channel .....5 in.  
Body steel, rounded load.....2 yds.  
Height loaded .....64 in.  
Height unloaded .....65 $\frac{1}{2}$  in.  
Carrying capacity ..... $2\frac{1}{2}$  tons  
Fordson hitch.....Special automatic  
Weight complete .....1960 lbs.

## Valvo Beltless Valve Grinding Machine



A SMALL self-contained machine for the grinding of valves has been brought out under the name of Valvo. It is a machine designed for use in main-

tenance shops and one of its distinguishing features is the elimination of all belts in the drive mechanism.

Both the work head and wheel head

have an individual motor for power and the parts are mounted on a substantial base. The grinding wheel is mounted directly on the shaft of a  $\frac{1}{4}$ -hp. ball bearing motor revolving at 3,450 r.p.m. The work-head spindle is driven by gearing from a  $\frac{1}{20}$ -hp. motor, the whole work-head being carried on a movable slide operated by a convenient handle at the left.

The valves are held by the stem in a split draw-in collet of a capacity up to  $\frac{9}{16}$  in. diameter. After the valve has been tightened in the collet and the work-head, which has graduations up to 60 deg., is set at the proper angle, the grinding is done by passing the valve across the face of the wheel, with a back and forth movement of the handle at the left, while the work is fed into the abrasive wheel by the hand feed wheel at the right.

The face of the valve is ground true to the stem. The average valve can be reground within 1 minute, and 2 minutes is ample time to refinish the worst of valves, it is claimed. The reamer for the valve seat can be ground at the same setting, thus insuring a proper and correct seating of the valve.

This machine is made by the Van Norman Machine Tool Co., Springfield, Mass.



# What Association Work Means to the Maintenance Manager

*This Division of the Cleveland Dealers' Organization Has Been Helpful and a Greater Program is Planned for Second Year*

By CLYDE JENNINGS

**T**HE Service Division of the Cleveland Automobile Manufacturers' and Dealers' Association was organized last July and the interest taken in the work is very plainly indicated by the fact that only one meeting has been missed. The division meets at noon on alternate Tuesdays and the discussion follows a luncheon. At present, the membership is restricted to the service managers of the firms associated with the Dealers' Association. The average attendance has been thirty.

When this division was organized, Herbert Buchman, manager of the Association, presented two questions as to the conduct of the organization:

**First—What shall be the nature of the discussions? Shall they be technical or pertaining to the business conduct of the business department?**

**Second—Shall this division extend its membership to all service shops, or shall it be restricted to members of the Dealer Association?**

The members quickly and positively decided that they much preferred that the discussions at these noon day meetings be devoted to policy and business management of maintenance departments. It was the opinion of the members that they were having meetings of their own men from week to week and in these meetings they were discussing the technical side of their work.

These discussions were intimately associated with the make of car and had been found highly beneficial. It was the belief of the members of the Division, however, that there was a great need for discussions of policy questions and such discussions would be of much more benefit to the managers than would a technical discussion. It was, also, decided to limit the attendance to service executives.

The second proposal was answered by the unanimous belief of the members that they should get their own houses in order and get an understanding among themselves before they attempted to educate the entire maintenance industry in Cleveland.

The policy has been that of having a different chairman at each meeting. Also, it has been arranged to have each member present called upon to speak on the question of the day. The topic for a meeting is always selected at the pre-

vious meeting, so that the men have time to collect such data as they may want, to present their points at the meeting. The members have greatly appreciated the fact that they are to be called upon and all of them have come prepared to support their opinions and in many cases later have admitted that they have been won over to a different point of view by the sound arguments presented. Also, those who have served as chairmen of meetings freely admit that this experience has been very helpful to them.

The questions discussed at these meetings are interesting and to illustrate very well the work this association is doing a few of the subjects for discussion follow.

## Discount on Parts

The argument was presented at this meeting that legitimate dealers should be allowed a discount on parts purchased for cars other than the one sold by the firm, as practically all car dealers were called upon to recondition cars of other makes.

If a dealer could get a discount on the parts he wanted for this car, he would buy the recognized parts and thus insure that this car would go to a new owner in proper condition. If no discount was allowed, the opinion was that the dealer would be tempted to buy parts made by other than the original builder of the car and might unknowingly obtain greatly inferior parts. It was agreed that the selling of original parts would be helpful to the reputation of the car as the car carries the name no matter how many times it changes owners.

All of the service managers agreed with this argument, but some said they were unable to put it into practice because the factory policy is that discounts should be given only to dealers handling this particular make of car. The service managers representing 16 cars reported that the factories declined to recognize discounts to others than dealers in their own cars.

The feeling prevailed at this meeting that the discussion had cleared the atmosphere of many misunderstandings. The service managers had heretofore had the feeling that they had been refused discounts on parts of some cars because of local policies. Now, that they have

learned that this was due to factory policies over which local dealers had no control, they feel much better about it.

## Keeping Grease Off Cars

One session was devoted to the subject of keeping grease off the steering wheels and other parts of cars undergoing repairs. Practically all of the 30 men present, told of their experiences and the conclusion was that it was not practicable to concentrate the effort to keep all grease off the car. It was suggested that seat covers, fender covers, and such aids to the cleanliness be used, and the mechanics be urged to do all that they could to keep the cars clean without serious loss of time. However, it was found much cheaper to employ cleaners to prepare these cars for the owners after the operation than to insist that mechanics lose time by keeping their hands and clothing in such a condition that they did not soil the car.

Several of the service managers present employed one or more men whose duty it was to go over carefully all cars that had been in the shop with the special attention to steering wheels, fenders and sides of cars. It was admitted by all that every effort should be made to keep grease from the upholstery.

## Peaks of Business

One of the liveliest discussions in the history of the division was on handling the peaks of business. Most of those entering into this discussion believed that owners should be urged to bring their cars in as early as possible in the day, that all of the available help in the department be brought to the ground floor to receive these cars, to make the quick service repairs, assist in diagnosing the more serious cases and if possible get the bulk of the work into the shop within the first hour and a half or two hours.

Then the men would return to their various stations in the shop and try to clear out all of the work possible in time for delivery in the last hour of the day's work.

Most of these service managers had had more or less disastrous experiences in attempting to distribute the arrival of owners throughout the day. Their conclusion was that it was better to



handle the business as it appeared than to attempt to govern the movements of the owner.

### Free Service

The subject of free service brought out a very general discussion, and while it did not serve the purpose of defining free service to the satisfaction of all members, it did reveal what factory and dealer definitions now existed for free service, and what obligations were placed upon the dealer in free service upon cars. This discussion resulted in much better understanding between the various service managers.

### Standards for Mechanics

The question as to what constitutes a competent mechanic in the automotive industry was another question that was widely discussed. It developed in the course of this discussion that a good many so-called mechanics had been

floating about from station to station spreading their own average of wages and conditions in shops and that these men were in a sense putting a handicap on the morale of the mechanics in the city.

While it was not possible to reach a definition of what constitutes a good mechanic, there was an exchange of information as to specialties and as to methods of having the men do varied tasks, and the discussion brought out many interesting and valuable ideas as to how the standard of workmanship which is now available may be used to the best possible advantage.

In this discussion, the question of wages was more or less incidental, and when the various managers reported the maximum and minimum wage paid in their shops it was found that some of them had been victims of the reports carried by the floaters. It seemed that

65 cents an hour was probably an average of the wage paid in the city.

### Flat Rates

The flat rate discussion was arranged on a plan similar to a high school debate. Men were appointed to present the affirmative, negative and the rebuttal. All the members present were the judges. The decision in favor of the flat rate was unanimous, even the men who argued in the negative voting for the system. A later poll showed that five of the members were using the flat rate and fifteen strongly favored it but had not used it for reasons of their own.

It is believed that, at the present rate of progress this association is making, within the next year they will open their membership to other service shops. The members of the division are firmly convinced that they, as representatives of the larger shops, have more to gain by the movement than the smaller shops.

## New Ruling Relieves Top Repairmen of Tax

CLARIFICATION of the Federal sales tax regulations as applying to the repairing of automobile tops has resulted from a recent interpretation of the law by the Commissioner of Internal Revenue, as the result of correspondence initiated by the Portland Automotive Trades Association.

Repairers of automobile tops have been relieved of financial loss which would have resulted from the enforcement of the tax, particularly on back curtains. The Portland association protested against the assessment of the tax against the back curtain, insisting that it is an integral part of the top. The ruling under date of August 30 sustains the contention.

It says, in part:

"With respect to top and body work, you are advised that:

(c) A person engaged in top and body work who makes complete new tops, complete bodies with or without tops, is held to be a manufacturer of such articles and for the sale thereof subject to tax, even though it may be in connection with an immediate repair job.

(d) A person who makes from raw material such articles as side curtains, detachable slip covers, detachable floor covering, etc., is held to be a manufacturer and subject to tax with respect to the sale of such articles, even though sold in connection with a repair job.

(e) No tax shall be levied with respect to top dicks and side quarters, back curtains, upholstery work, permanently attached floor coverings and body and top repair work not involving the sale of articles such as side curtains, detachable floor coverings, etc."

The circular letter of August 12, ruling that the repairman who finishes pistons is in reality a manufacturer and the fin-

ished piston is subject to the five per cent sales tax, says:

"I beg to call your attention to the following letter just received from the Commission of Internal Revenue, relative to the distinction between finished and semi-finished pistons.

"There seems to be a lack of understanding on the part of many taxpayers as to just what is meant by finished and semi-finished pistons, and as to whether or not either or both are taxable as completed automobile parts. For that reason the following is issued for your information.

"A finished piston which merely has to be slightly ground down to insure a perfect fit in a cylinder is considered a finished piston within the meaning of the law, and is not subject to tax when sold by the manufacturer thereof, but the person who further machines and finishes it is considered the manufacturer of the completed part and must make return and pay tax on his sale of the same.

"Rough piston castings are not subject to tax."

This seems to be contradicted by subdivision (b) of the August 30, ruling:

"(b) A person who does not manufacture any parts or accessories for sale separately, but is engaged in doing strictly repair business and makes only occasionally a part needed for an immediate repair job performed by him, is not a manufacturer, and is not required to pay any tax with respect to such parts or accessories."

This paragraph is used as the basis for belief that the tax does not apply on semi-finished pistons machined to fit immediate repair jobs, and has resulted in an appeal for further interpretation.

The Portland association, in the interest of its cylinder regrinder members,

as well as concerns throughout the state engaged in this type of work, has asked for a further ruling on this point in the following letter.

"I wish to call your attention to an apparent conflict between your circular letter of August 12th relative to tax on pistons and the letter dated August 30th pertaining to the manufacture of parts or accessories and auto tops.

"The August 12th letter quotes the Commissioner of Internal Revenue in this wise:

A finished piston which merely has to be slightly ground down to insure a perfect fit in a cylinder is considered a finished piston within the meaning of the law, and is not subject to tax when sold by the manufacturer thereof, but the person who further machines and finishes it is considered the manufacturer of the completed part and must make return and pay tax on his sale of the same.

Subdivision (b) of the August 30th letter reads:

A person who does not manufacture any parts or accessories for sale separately, but is engaged in doing strictly repair business and makes only occasionally a part needed for an immediate repair job performed by him, is not a manufacturer, and is not required to pay any tax with respect to such parts or accessories.

"This office would like to have a further ruling regarding the tax on pistons when semi-finished pistons are machined to fit cylinders and are installed as part of a repair job. It would seem that section (b) would consider such a workman a repairman and not a manufacturer, even though the August 12th letter very specifically labels him as such."

# Winter Methods of Building Business

*"Personal Service" Is Given a Definite Meaning  
by "Jennings' Service"*

**H**ARRY and Frank Jennings, operating "Jennings Service," on tires and batteries, in Kansas City, Kans., know exactly what they are going to do this winter, to promote business. They also know exactly what result is aimed at—and they know that the steps they will take will produce the result.

They know it, because they did the same thing last year—and reaped the benefit during the past spring and summer. The Jennings Brothers had their best year in 1921; considerably ahead of 1920, and of other previous years. Here is the reason:

When winter approaches, both of the brothers get out and hustle for new business, new customers. By the time spring and the rush season in service work has come they have accumulated a big bunch of new customers and friends, and they have to spend all their time in the office and station meeting the customers for their service.

During the spring and summer, one outside man cares for the selling "on the street"—W. B. Henderson, a real hustler himself. He spends practically all of his time going from office to office, calling on business men, and trying to sell them tires or service. He is adding steadily to the list of regular customers—a few every month, who count up to a surprisingly large total in a year.

But in the winter, the Jennings brothers personally call on the local business men, getting personally acquainted with them, telling them about tires, and about other incidentals which the firm carries—and telling about the service.

## Hooking Up New Friends

These efforts show an immediate result in the sales made; but the sales are not the prime reason for the winter solicitation. The purpose is to get new friends hooked up to the establishment, who will gravitate to the Jennings place in the following spring.

Building a business through impressing the thought of personal service, service by the owners of the business, can be successful only when the service-purveyors are imbued with the real spirit of service. It's not something that can be superficially imposed on any sort of a temperament, or added arbitrarily to natural qualifications, like a memorized list of prices.

The Jennings brothers advertise personal service, giving the public to understand that they, personally, are interested in the customers' problems, and

will personally attend to their wants. They actually do give this personal service in their store and shop.

## What "Personal Service" Means

To them "personal service" means two things: First, their personal contact with the customers in the store; and second, their personal supervision of the work.

The Jennings business has been built, and built with remarkable solidity during the past year especially, through this personal service idea. During the busiest service season, both brothers were in the store, personally meeting the customers, personally discussing their problems, and personally overseeing the work.

Here is one illustration of the lengths to which these boys have gone to maintain the "personal" element. They had been operating successfully, two branch stores, in other parts of the city. They found that they were falling down on the "personal service" element, because they could not be in three places at once—both were needed to meet all the customers who came into the one store. So they discontinued the branches; and now are getting a constantly increasing business at the main store, because the customer can always meet a Jennings there.

The Jennings Tire Service Co. is, therefore, not an institution, but a live personality, and it does not seem to make much difference which Jennings waits on a customer, the customer is satisfied that he is getting the personal attention.

Regularly, once a month, a circular letter is sent out from the Jennings Tire Service Co. to its increasing list of customers. Always, the company has some real attraction to offer the customers; a price on a tire; a proposition on a trade-in; a feature in batteries; something for car, truck, motorcycle. Sometimes the company has to "scout around" to find an offering that will attract eager attention, and bring a response; but it provides the attraction, even if it has to make a sharp sacrifice to do so.

## Letters That Talk Service

This bargain is not the conspicuous feature of the letter. The bargain is mentioned down towards the close of the letter, as an incident. The letter is about the company's service. This is harped on in new and fresh language, from new angles, every month. More thought and trouble are put into preparing the service part of the letter than

into the task of finding a real bargain for the incidental feature.

Anybody can dig up a bargain offer; this firm tries to find the sort of bargain offer that is sure to attract response and win the gratitude of the customers. Then it demonstrates, to itself and to the customer, that the bargain is secondary to the regular service which this company provides.

As a result, the customers who take advantage of the bargain are not merely bargain hunters; they think of this as a service station and not as a place to buy goods cheap.

These men have shown the Kansas City public their spirit of personal sacrifice by their eager and generous participation in many local enterprises. Recently a visitor at the Jennings store was told that neither of the brothers was there. Inquiry finally elicited the information that one was helping the local association of grocers with their pure-food show and the other was serving on a committee of the local American Legion organization, in preparation for the Legion convention.

There is one objection to the building of a business on personality. What will happen when the persons may be absent or, under possible later conditions, do not meet the trade? This objection is met in the Jennings organization by training high-class "understudies" as salesmen and assistants in the store, men whose personalities make the desired favorable impression on the customer, and who can give the same sort of personal service that the Jennings brothers themselves aim to give.

## DOING ONE THING WELL

If you want to do a real good job of installing new water hose connections here is the way to do it. After the old connections have been removed clean the surfaces of the fittings on the cylinder block and radiator. Then wrap a layer or two of string or twine upon the fittings and give them a coat of white lead, painting over the string. Next slip on the hose connections.

When the rubber hose is in the proper position, wrap it completely with tape. Then apply orange shellac over the tape and fasten into place the metal hose clamps, making sure that the slotted heads of the screws are on the same side. It makes a better looking job and all operations of loosening or tightening the screws can be carried out from the same side in a more systematic manner.



## An Electrical Service Station In the Making. No. 5

### How to Make a Simple Armature Tester That Will Make a Good Impression on the Customer

**T**HERE is no one method of testing armatures that is infallible, and one hundred per cent certain to locate the trouble in each and every case. One very simple method is available, however, which if carefully used will usually show shorts and open circuits, this being a method that uses a dry cell and an ammeter.

Like all testing equipment, it is based on fundamental electrical law, which in this case is that of the flow of current in circuits, known as Ohm's law. Stated roughly, this law means that the easier the path for the current, the more current is going to flow. In other words it is electrical common sense. We accordingly apply this simple principle to an arma-

ture. When we close the switch in Fig. 1 there will be therefore, two paths for the current through the armature, the direct one from 1 to 2 and the indirect one through the other seven coils, and as the current likes to take the easiest path, even as you and I, we find that  $\frac{7}{8}$  of the current goes by the direct path and  $\frac{1}{8}$  by the indirect path. This fact gives us a means of telling whether there is something wrong with the armature or not.

#### What the Readings Mean

Assume now that we test from bar No. 1 to No. 2 and get a certain reading on the ammeter, say 12 amperes. Then we turn the armature and test from 2 to 3, then from 3 to 4 and so on, all around the armature and compare the readings in the various positions. If the readings are all about the same, say from 11.5 amperes to 12.5 amperes, we can figure that the armature is neither shorted nor open.

Suppose, however, that the first reading was 12 amperes and two or three more were nearly 12, but that at one pair of bars the current reading dropped to 1.5 amperes. This would show an open circuit in a coil or in its connection to a commutator bar, and the only reason that we get any reading with an open circuit is that there is the other connection between the bars, around through all of the other coils, and this connection being of such high resistance accounts for the low current reading on the meter.

Now on the other hand, let us suppose that a chip of metal has become lodged and wedged between commutator bars 3 and 4. Bars 1 and 2 will test normal, and so will 2 and 3, but when we come to 3 and 4 the reading will not be 12 amperes but may be 18 or 20, depending on the condition of the dry cell and the resistance of the wires and connections.

This high reading on the meter shows a corresponding low resistance in the circuit, which can only be due to a short circuit cutting down the effective resistance of the armature.

#### Making the Tester

Now of course it is possible to lay an armature on a bench or hold it between your knees, take a dry cell and an ammeter and make a temporary connection, for the test, but what about the effect on your customer if he sees you work in this slip shod manner? He will figure that your time is worth about 50 cents an hour and will be mad if you charge more. On the other hand, if you take him to a neatly made test board, with the meter properly installed, and with some device for holding the armature and making contact with the commutator, two things will immediately result.

First, you will work with more assurance and accuracy than if you were juggling the parts in your lap, and second the customer will be impressed, not only with your equipment but also with the fact that you work in a business like way. The net result is that you not only find the trouble in the armature, but you gain a booster for your shop and methods.

#### Construction of Tester

Any man making his own equipment will have his own ideas as to the way he wishes to build it, but reference to Fig. 2 will serve as a start from which to work. The armature is shown supported on centers, much as it would be in a lathe, but they do not have to be very accurate, as the armature is only

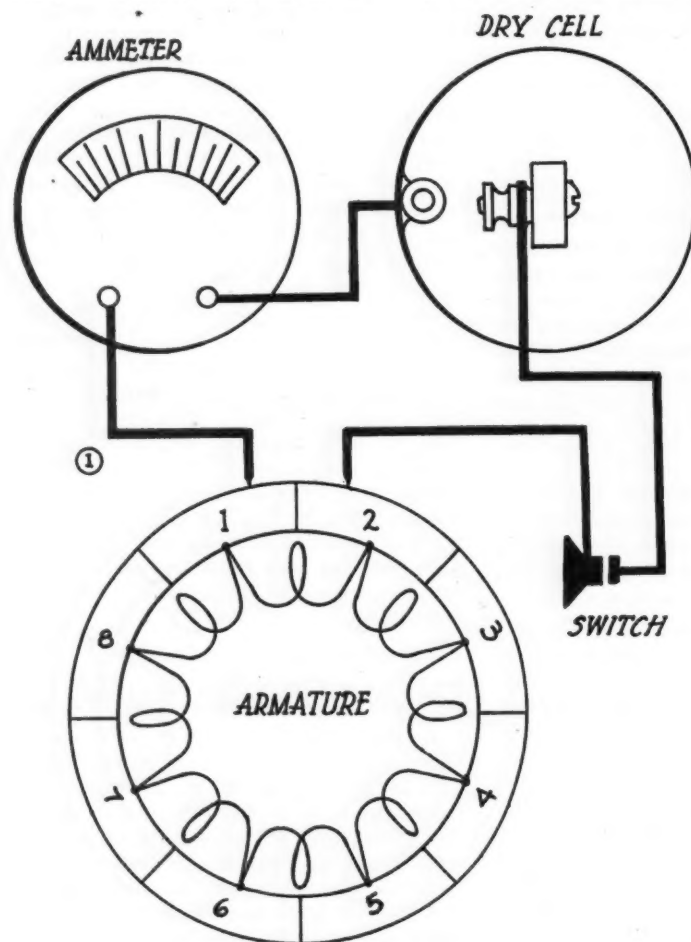


Fig. 1. Armature Test, Using Dry Cell and Ammeter

ture, which, simplified, has circuits as shown in Fig. 1, there being generally two circuits between commutator bars that are next to each other. For example in the simple armature shown, bars No. 1 and No. 2 have a coil connecting them, which is the obvious circuit between them. Careful examination will show however, that there is another connection by way of all the other coils, going from bar 2 around past 3, 4, 5, 6, 7, 8 and finally back to No. 1.



turned slowly by hand, in order to test all around the commutator.

Armatures of different diameter and length will have to be considered, so that the centers should be mounted high enough for the largest armature and provision should be made for varying the distance between centers. As shown in Fig. 2 the right center is mounted on an L shaped piece of iron the base of which is slotted, and a bolt, washer and wing nut serve to clamp it to the wood base in any desired position.

The ammeter, switch and binding posts for the dry cell may be mounted on a vertical board at the back of the base, and connections can be made as shown, these being fundamentally the same as in Fig. 1. The fingers shown making contact with the commutator can be made of spring brass, mounted on a small piece of wood or other insulating material, and this piece can be hinged to the base and pulled by a small spring (not shown) toward the commutator. The tips of the brass fingers should be shaped so that one rests on one bar, and the other on the next bar.

An armature tester of this type will serve very well for the small electrical shop, until the growth of business makes it desirable to invest in one that gives a variety of tests, and due to its construction, gives the shop a still more business like appearance.

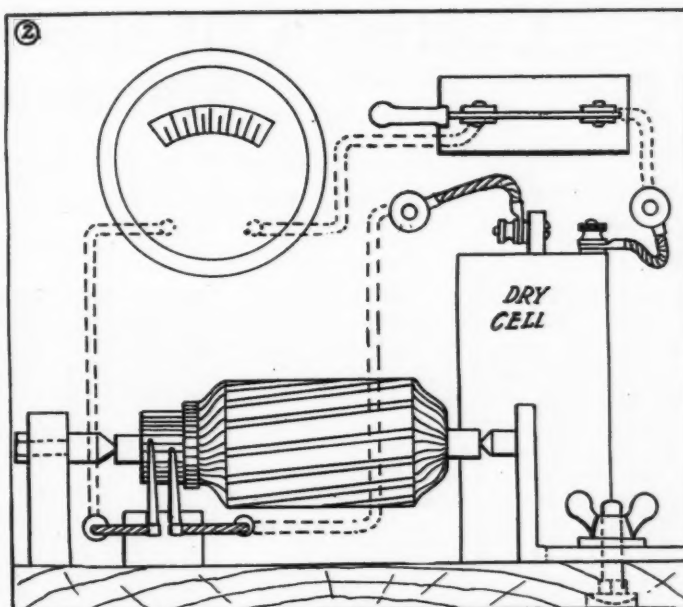


Fig. 2. Easily Constructed Armature Tester for the Small Shops

## Henry Tells Dad a Thing or Two About Seasons

Sept. 27, 1922,  
Honore College, New York.

Dear Dad:

I agree with your statement in your last letter that "there is, on the part of the car owner, a growing feeling that his automobile should be in service during the winter and that it should not be wrapped up in cheese-cloth and laid in the manger of disuse," but, you ask, how can you make that feeling more general, more healthy in its growth?

I would think that with a little well-directed talk, you can convince the owners in your territory that it costs but a trifle more to keep the car "doing its bit" in winter as well as in summer.

Of course, few car owners want to be plowing around in snow that is four or five feet deep, but there are days—plenty of them—when driving is just as easy as any day in warm weather. Why not cash in on them? Why not show the car owner how to keep the car going all winter?

The fear of freezing is easily talked out of most car owners—there are effective methods which you have to sell which will do away with this item of resistance. Every open car owner in Walton City is a prospect now for either an enclosed car or a winter top for the open one.

The fall and winter are Nature's "wonder times," and there are many days before the first heavy snow flies that can be turned into money for you. A strong seasonal appeal will often do the work if it is backed with conscientious selling effort.

Surely you know, Dad, that the great outdoors is never more beautiful than when the red and brown of Autumn are on the trees and bush. Never is the air so refreshing as when, along the wide drive, the automobile purrs smoothly on over great hills and through dark woods.

What about the rifle and the old bamboo pole? You know what a blessing it is to go out over the week-end to some river bank where fish and game abound and get

right into it with both feet without flies and mosquitoes making every move a slap and a damn.

And when is there a better time to take the kiddies out and let them frolic in that health-giving air? It makes their studies easier, they think more clearly, they live like human beings when Dad has an automobile. And Dad is better able to wrestle with his business problems during the week, too, without a grouch.

That thing about the kiddies, is the best way to get at a man, you can't make it too strong. Every man will agree with you and your reward will be not only a few dollars but a feeling that you are playing as big a part in the making of our future citizens as the school teacher who teaches them their lessons.

And while I'm on the subject, Dad, why not talk it over with the school teachers? How about a prize for the best essay on where Dad took their students over Sunday? What they saw, how they liked it? And maybe, as a friend of mine who's father owns an agency in New York City, said the other day, there are kids who cannot own an automobile. What's the matter with taking a flock of them out some Sunday for a ride? It'll do you good in more than one way.

There are a thousand seasonal appeals to be made which will fit in any situation. Get busy now and do something—you'll have to if you want to make this the biggest year you ever had. Get together with Fred Angel, the sporting goods dealer there, and put up a big display of the things the hunter and fisherman needs. Remember that he needs an automobile just as much as he needs a gun or a rod if he would go where "the sun rises first, the quail are the thickest and the river the prettiest."

I must be off now, Dad, to class, but will look forward to your next letter with interest. My regards to all the boys in the shop and tell Tim to drop me a line about the football team.

Your loving son,

HENRY.

# Cutting Out the Red Tape to Make Maintenance Pay

*Return Post Card Aids in Getting Customer's Car Into Maintenance Department for Inspection. Flat Rate Operations Largely Responsible for Success*

**C**OMBINED engine operations at a flat rate are among the features of the system in the large new service station of Guy A. Willey Motor Co., distributor of Paige and Jewett cars in Philadelphia. The flat rate prevails for groups of service operations, except where there is an intermingling with other work closely allied, but for which, because of its nature, an extra charge must be made.

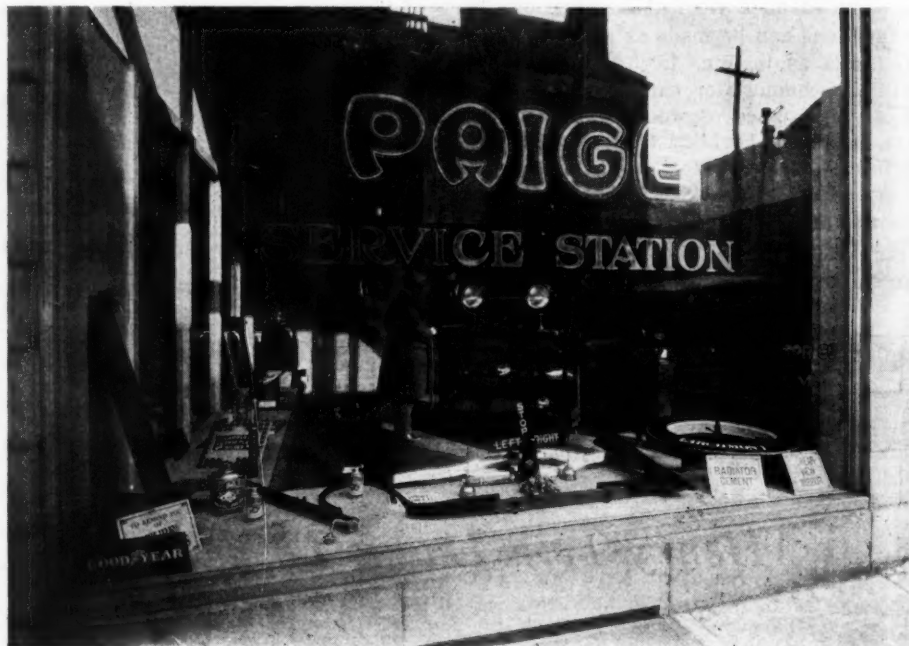
For instance, in performing a group operation on a flat rate basis, such as tuning the engine, removing carbon and grinding the valves, it might be found necessary to supply new parts in order to quiet the valves and so turn out an adequate job. This, of course, would mean an expense to the customer additional to the stated flat rate for the group operation.

Such operations have a group number, known to the service station employees. To the workman, No. 101 means "remove carbon and tune engine;" No. 102 signifies "remove carbon, tune engine and grind valves," the initial figure in this list designating operations relating to the engine. This relation of figures to operations is carried out through the list. There is no "Master Sheet" method in its general sense, used here, however, as too many of the operations tend to overlap.

The service has some "high spots" with a touch of originality, which will be described here, avoiding much of the ordinary routine found in other large stations.

The Paige service station is for Paige car owners' convenience and assistance and there is no inclination here to go into the business of car repairing for the public. Cars that are not handled by the sales end are not serviced. When a customer brings his car to the company's six-story service building, he is greeted by an order taker, who receives the car and the customer's instructions. If these instructions are not sufficiently clear and specific to indicate that the customer realizes what is needed for the car, the order taker calls a tester, who, of course, is a Paige expert. If the vehicle needs only minor attention, such as some small adjustment, it is cared for in the "quick service" department, to get the customer on his way as quickly as possible.

Should the necessity exist for a more thorough overhauling, on the advice of the tester, the customer is told just where the trouble lies, approximately how long it will take to fix it and what the cost will be. When the tester has a



*The company has been able to sell its maintenance efficiently by appreciating fundamentals of good business. Take the window above. It is clean, inviting and full advantage is taken of it for the selling of accessories to an owner whose car is in the maintenance department*

clear idea of what the customer desires, the Repair Order, or Working Order Sheet, is made out in long hand for the customer, who signs it as his signal for the repair shop to proceed with the work. Just here, an idea enters which is original with the service manager.

## Repair Order "Flyer" Saves Time

A blank sheet, of the same size as the Repair Order, is slipped beneath it, with a carbon sheet between. As the Repair Order is written up in long hand, the operation items are thus transferred at once to the blank sheet, which is numbered with the same serial number as the Repair Order and rushed to the repair shop as a "flyer," without the delay, usual in other shops, necessitated by having the Repair Order in long hand typed on the duplicate, with carbon for the triplicate. By the time this is started by a stenographer, the shop has received the order to go ahead and before the typing is finished, actual work on the car has been begun. The Repair Order is filed alphabetically by the customer's name.

The typed Repair Order Sheet, corresponding to the duplicate in most offices, is a larger form than the original and is yellow, whereas the former is white. The reverse of the form contains the summary of labor and material, including itemized parts and accessories, sundry items, and "outside" sales.

A carbon sheet transfers the typing to the stiff manila shop form. The car in work is tagged in the usual way, with name and number. The time cards are operated in the customary manner by stamping "on" and "off." The cost sheet, duplicate copy of the bill rendered, time cards, all requisitions and shop job ticket are placed together in an envelope bearing the name of the car owner and the number of the job, and filed numerically.

Only skilled mechanics handle the car and after the service work has been completed, the car is turned back to the identical tester who first tried it out for the customer and who must "O. K." the work before the vehicle is released for delivery. This is done to insure efficiency and satisfaction. When the car has been tested the second time, a red card is hung on it, showing that the job has been completed.

Of course, if there is a squeak, or a rattle from ordinary causes; if a new brake lining is needed; if there are lubrication troubles; difficulties with the carburetor, or in starting, or lighting, or anything short of a "long, shop job," the quick service department attends to the car.

## Customers Invited to Read Job Tickets

An unusual procedure is the verbal invitation extended at the service station to



all customers to read the job tickets on late model cars in inspecting the plant, the idea being to show that the mechanics are not working on all cars at the same points, as indicated on the job tickets, proving that the original designing and construction work was high grade, and that no particular points show weakness, or tendency to break down.

A blackboard posted conspicuously in the shop, serves to indicate how the work is coming along. Headings on this board include "Job Number," "Name of Customer" and date "When Promised."

The management is much pleased with its monthly inspection arrangement which appears to be well thought of by customers, particularly because of the thirty-eight operations which are performed free of charge for the first three months after the purchase of a new car, provided it has not been run more than 3,000 miles, and thereafter at a charge of only fifteen dollars a month. Of course, where materials have to be supplied, there is a charge therefor. The itemized list of service operations under this head follows:

- 1 Lubricate front wheel bearings and adjust if necessary.
- 2 Line up front wheels and steering.
- 3 Adjust and lubricate steering gear and all steering parts.
- 4 Lubricate generator.
- 5 Lubricate fan.
- 6 Lubricate water pump.
- 7 Lubricate distributor shaft.
- 8 Clean and adjust spark plugs and distributor points.
- 9 Inspect oil and water circulating system for leaks.
- 10 Adjust fan belt.
- 11 Adjust spark and throttle control lever.
- 12 Oil and adjust horn.
- 13 Tighten connections on vacuum tank.
- 14 Test oil in motor and refill with fresh oil if necessary.

- 15 Tighten nuts on radiator slides.
- 16 Lubricate starting motor.
- 17 Tighten motor support bolts.
- 18 Tighten exhaust and muffler.
- 19 Inspect electric system and see that all lights burn properly.
- 20 Tune up motor and adjust carburetor if necessary.
- 21 Tighten all rims on wheels.
- 22 Lubricate rear wheel bearings.
- 23 Tighten rear wheels on axle shaft.
- 24 Tighten all spring clips.
- 25 Tighten spring shackles.
- 26 Lubricate all spring bolts and shackles.
- 27 Lubricate service and emergency brakes.
- 28 Adjust service and emergency brakes.
- 29 Fill transmission and differentials with oil if necessary.
- 30 Lubricate universal joints.
- 31 Fill all grease cups on the car, screw each cup down and refill for use between inspection days.
- 32 Examine and lubricate clutch throwout bearing, adjust clutch pedal for floor clearance.
- 33 Tighten all motor bolts and nuts including bolts in motor, also dust and splash pans.
- 34 Tighten body bolts.
- 35 Tighten all loose bolts and nuts on car.
- 36 Give car oil bath.
- 37 Remove door rattles.
- 38 Test battery—Fill with distilled water if necessary.

#### REMINDERS

- 39 What is condition of paint?
- 40 What is condition of upholstering?
- 41 What is condition of top?
- 42 What is condition of car and chassis with regard to cleanliness?

Under this agreement, all cars are to be delivered to the service station and called for by the owner, or his authorized representative. The service station notifies the customer, by postcard, of the date and time to bring in the car for this service, for it is necessary for the company to have each car in on the day appointed to avoid a rush at some periods and a dearth of work at others. If a customer cannot bring his car in on the

date fixed, the work has to be put over until such a time as it will fit into the service department's regular schedules.

#### How the Postcards Work

Each postcard thus sent out to a customer after the purchase of his car is in two parts, one to be used by the customer as a return postal, stating distinctly that he will have the car in the service station at the time and day appointed. The other part of the postcard announces the date for the bringing in of the car to the service station; that there will be no charge for this inspection or minor adjustments for the period of three months after purchase; that if there is any charge work to be done on the car, the owner will be advised of its nature and cost and the work done only on his order.

After each service job on a car, as soon as the customer receives his bill, another postcard is issued to him, this one also having a return portion. The part addressed to the customer states that the house notes the car recently was in the service station and requests that the attached card be filled out and remailed. It also offers to receive suggestions for better service. The detachable card addressed to the company service station is in the form of a questionnaire. In the upper left hand corner, the order number of the car, as already serviced, is given. The questionnaire asks:

"Were you pleased with the work?"

"Did you ask any information you didn't receive?"

"Did you receive courteous treatment?"

"Do you like your car?"

"If not, please state particulars."

Then follows spaces for the customer's signature and address.

#### Valuable Data from Courting Criticism

In thus frankly courting criticism, the service station is able to acquire a large volume of constructive suggestions which are found to be an actual aid all through the organization. While, naturally, there are a few "brickbats," these are generally found to be prompted by some misunderstanding on the part of the customer as to the not-charge work to which he is entitled, or because he has failed to follow out instructions and suggestions on operation.

A service letter, suited to the occasion, is also sent about three weeks after a customer has purchased a car.

Shop facilities are such that a Paige car can be assembled with all its equipment and any repairs, such as to the top or body, reupholstering, painting and varnishing, parts replacements and electrical work, like the recharging of batteries can be made quickly and efficiently.

A shop clerk looks after the tools. The larger units of machinery include two lathes, two drill presses, one small and one of medium size, a grinder, a power hack-saw, a welding outfit and an air

Philadelphia, Pa., \_\_\_\_\_

We notice from our records that your car was in our service station recently. We ask you to kindly fill out the attached card and return to our general manager.

Any suggestion you may offer will receive consideration, as we are endeavoring to improve the quality of service this company extends to its patrons, and with your assistance we believe we can satisfy every patron.

GUY A. WILLEY MOTOR CO.

Philadelphia, Pa., \_\_\_\_\_

Your Car No. \_\_\_\_\_ will be due for its monthly inspection on \_\_\_\_\_, 192\_\_\_\_. Please bring or send it to our service station at Vine and Sixteenth Sts., before noon on that day.

There is no charge for this inspection or for minor adjustments. You will be advised of the nature and cost of any charge work necessary, and such work will only be done on your order.

Please fill in the attached card notifying us that your car will come in at the time specified, or in case this appointment is inconvenient, please arrange another day.

GUY A. WILLEY MOTOR CO.

GUY A. WILLEY MOTOR CO.

Date \_\_\_\_\_

Gentlemen,

I will have my car in your service station for monthly inspection on \_\_\_\_\_

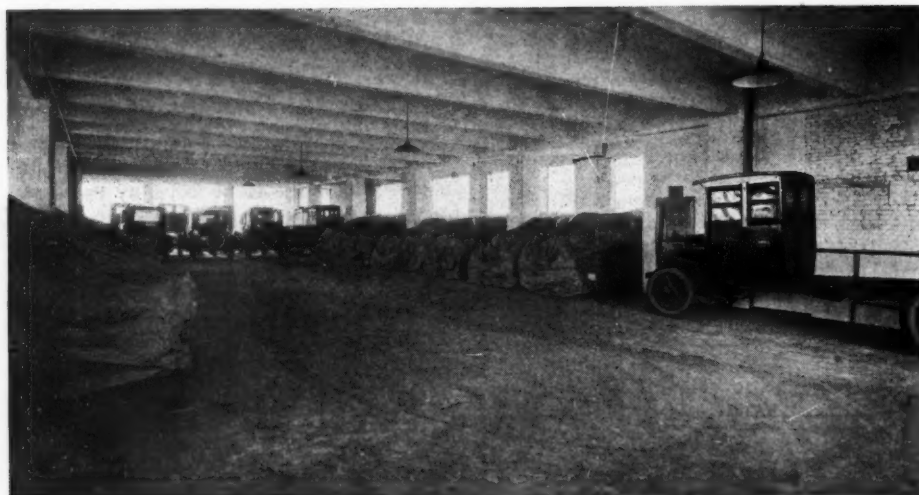
Name \_\_\_\_\_ 192\_\_\_\_ at \_\_\_\_\_ M

Address \_\_\_\_\_

Telephone \_\_\_\_\_

BROAD STREET AT VINE  
PHILADELPHIA,  
GENERAL MANAGER'S OFFICE

This postal card is sent out to a customer after his car has been in the maintenance department. It furnishes valuable data handy for shaping future activities



Cars from the factory are examined, cleaned, lubricated and tested and finally covered with special paper cover to protect them from dust, moisture and scratches

compressor, in addition to such devices as motor stands, vises and the usual complement of bench tools.

On the first floor are the service station offices, unusually large and well lighted, the showroom for automotive equipment, of which a considerable stock is kept, some of it in handsome glass-fronted display cases, where it is plainly visible through a huge show window, and the "quick service" department. On the second floor are the parts department and stockroom, occupying space of 54 by 125 feet. An automatic dumbwaiter and special direct telephone connections between this department and the shop, are features.

The house prides itself on the completeness of its parts section, where are many bins and drawer sections, all carefully numbered and labeled. There is a special section for parts for used cars. On the third floor is the store room, for cars before and after repairs have been made on them and where service inspec-

tions are made. The repaired cars and the cars awaiting repairs are arranged on opposite sides of the room.

#### New Cars Encased In Paper Covers

The fourth floor is devoted to new cars. Every Paige, before it leaves the factory, of course, is carefully inspected, every unit of mechanism being gone over and it is thoroughly lubricated and tested on the road; but that is not enough for the Guy A. Willey Co., which goes through a similar process on the arrival of each new car. After each car has been cleaned, lubricated, inspected and tested, it is covered with a dust-proof paper envelope which covers it completely, keeping out all moisture, as well as dust and eliminating danger of marring or scratching.

The fifth floor is for the used car repair department, where everything in the way of mechanical devices and tools is as complete as for the general repair and service department. Segregating the two shops does away with confusion.

The sixth floor is the main machine, repair and job floor, with both heavy and light equipment, as mentioned. There is a special radiator repair room and an oil room.

#### A Word About Service Letters

The house mails to each customer and prospect, about the middle of September, or the time he would be likely to return from his summer vacation, a service letter suggesting overhauling the car at this period.

About the first of October, another letter may be sent, telling how to "Keep the Car Out of the Shop," or a little about preventive servicing. Around Thanksgiving time and New Year's Day letters also are sent advising customers and prospects not to let their car remain unserviced till the job grows to be a complex and expensive one, or to wait till there is a rush.

Service pointers are laid down as follows:

Service must be sold by methods wherein are applied the same principles as those governing the sale of any commodity.

The service department is invaluable in establishing those indefinable assets—confidence, good will and prestige.

Potentially there is sufficient repair and overhaul work NOW, to insure every service station working almost to capacity.

The customer must not be allowed to drift in casually.

Emergency repairs are not lasting ones; periodic overhauls are necessary.

Service is not merely something to be given as a premium with the sale of a new car, but a very important part of the business, which the dealer must go after and the owner should be sold on the economical idea of preventive service.

## 23 Years Ago This Week In Motor Age

### Automobile Club's First Meeting

NEW YORK, Oct. 16—Some thirty-five "automobilers" (for this word thanks are due Secretary Hedge) members for the most part, present or prospective, attended the meeting of the Automobile Club of America at the Waldorf-Astoria hotel tonight to accept the final report of the acting directors on a constitution and by-laws and the election of officers. The club had its inception last June at which time a preliminary organization was effected.

The St. Louis Motor Carriage Co. has increased its capital stock from \$30,000 to \$50,000.

The New York Electric Vehicle Company has elected R. McAllister Lloyd president in place of Isaac L. Rice, retired. An executive committee composed of Isaac L. Rice, John Jacob Astor, George H. Day and Martin Maloney was chosen.

### The Liquid Air Automobile

Under the above title an extended discussion of various proposals to use liquid air for automobile power was published. Charles E. Tripler came forward with the announcement that in six weeks or two months he would have in operation an automobile propelled by liquid air. The article discounted various schemes for the use of liquid air and declared "Altogether its employment for power purposes is at present fanciful rather than scientific."

### At an Early Show

PHILADELPHIA, Oct. 20—While the National Export exposition in its entirety reflects the greatest credit upon its promoters, the portion of the exhibition devoted to automobiles and accessories has at present by no means a representative appearance. In fact the space set apart for the automobile show is the only section which is not absolutely full to overflowing.

Among the few exhibitors mentioned were Locomobile Co. of America "with two motor carriages and a 'pony' trap; Waverly electric automobiles, the Hertel hydro-carbon motor carriage, United States Ball Bearing Co., Rubber Tire Wheel Co., and International Automobile & Vehicle Tire Co.

### A Gospel Automobile

Rev. A. S. Parsons at Oakland, Cal., is having built a Gospel automobile from which he intends to conduct revival services next spring. The wagon, it is said, will weigh three tons and will be run by a gasoline motor of four horsepower. The bed is to be 13½ feet long and five feet wide. If the reverend gentleman should get into sandy or hilly districts he may find practical use for the faith that will move mountains or his four horsepower must be geared to a snail's pace lest the three tons of weight should be stalled.



# Getting Ready for Christmas?

*Here Are Some Ideas for the Dealer to Get His Share of the Holiday Trade*

**T**HE first few cold days, side curtains and winter tops, rosy-cheeked citizens in enclosed cars, a mixture of overcoats, raincoats, topcoats, zippy winds and right on the heels of it, winter and then the holidays. True, it is not too early to have your Christmas campaign all layed out, or at least started, so that you, too can get your share of the thousands of dollars that are spent during the weeks before the Yuletide.

The automotive dealer will find, perhaps a lull in sales and work of all kinds for a while now, but he can make it up and get a good start on the Spring if he will put the right kind of selling effort into his Christmas plans. Just a little over two months now and folks will be saying, "What will I give?" Make your answer, "Something automotive," and make it strong.

"Buy an Automotive Gift for Christmas" is the slogan of the G. Norman Baughman Co., Tampa, Fla., and it is printed on a card with a border of holly and a wreath with Santa Claus in the top center. The Moto Meter Co., Long Island City, N. Y., has adopted as a Christmas selling line, "An ever visible reminder of your thoughtfulness."

"Give Automotive Gifts for Christmas" is another line which is a good one for your Christmas advertising, on your letters, cards, posters and stickers. If the dealer will remember, that next to his home, a man's automobile is the thing closest to his heart, he will see that it is not going to be hard to sell something for the car.

Getting in touch with members of the owner's family by letter or personal call, telling them of the conveniences offered by a visor, spotlight, motor meter, bump-

er or a spare tire and cover, will lead to not a few sales. The fact that an automotive gift is really a gift to the whole family and that the car will never be used without thinking of the person who gave it, is another item not to be overlooked.

A list of accessories that can make up your Christmas gift suggestions, follows:

- Spare tire.
- Spare tire cover.
- Spare tire locks.
- Spare tire carrier.
- Visor.
- Wind deflectors.
- Bumpers.
- Robes.
- Ash receptacles.
- Henters.
- Trunks.
- Spotlights (enclosed car type).
- Spotlights.
- Tire chains.
- Windshield cleaners.
- Winter tops.
- Seat covers.
- Fire extinguishers.
- Parking lamps.
- Stop lights.
- Step plates.
- Rear view mirrors.
- Automotive camping outfits.
- Flash lights.
- Cigar lighters.
- Oil and gas tanks, extra.

You can sell service, too. In this, you might employ the Christmas Merchandising Certificate plan which would cover nearly all parts of the Christmas sale. These certificates can be offered for sale in \$5, \$10, \$20 or in any denomination you choose and can be made redeemable for tires, accessories or service. The feature of the certificate is that a man can buy it and present it and leave it to the receiver to decide for himself what he wants.

It should not be necessary, in all

cases, to go to the expense of having certificates printed—a letter will do, or a Christmas card, worded something like this, might serve the purpose:

"Dear Mr. Smith:

"Santa Claus has ordered us to write you and tell you that he has on his gift list, your name, and, as we have been appointed an Authorized Christmas Gift Station by the venerable old gentleman, and you are in our territory, we are enclosing a card which is redeemable here by you for the amount shown, in either service, accessories or tires.

"It seems that your friend, Mr. Thomas Jones, told Santa that you are a pretty enthusiastic motorist and told him, too, that you own a Runwell car. You can come over any time and tell us what you want. We shall be glad to help you in selecting something useful for your car.

Our kindest holiday wishes,

The Chicago Runwell Co."

The card enclosed can state simply that it is redeemable for the amount paid and can state again the name of the sender. In order not to get it too much like a mere credit slip, we would prepare something like this:

"The Chicago Runwell Co., being appointed by Santa Claus as an Authorized Christmas Gift Station, presents you with this certificate, with the compliments of your friend, Mr. Thomas Jones. It is redeemable by you, John Smith, for service, accessories or anything you might desire. It's value is \$—."

## Merchandising Profits

The garage owner sells accessories but if he waits for some one to ask for them he does not sell enough of them or sell them fast enough.

As the regular customer comes and goes each day he sees the accessory display. He may see a new stock of cigar lighters and he thinks, "It would be handy to have one of those." But he does not stop and buy. They will still be there tomorrow. He may get one later. Often he postpones until the desire is forgotten or some department store bargain sale catches him. The garage man loses a sale and so loses his legitimate profit.

When your cigar lighters come in, ask

each customer if he wants one when he drives in to leave his car. The man who would otherwise postpone will buy. Order a stock of lighters and then sell them, don't wait for someone to buy them. You should be able to secure them packed 10 to a carton as recommended by the Standardization Committee of the Automotive Equipment Association.

But if you are not sure you can sell 10, buy less, even if you have to pay more for each one because of buying in smaller lots. It is better to buy 5 at \$2 each and sell them at \$2.50 each than to buy 10 at \$1.75 each and sell 7 of them at \$2.50 each. Here is the reason why:

5 cigar lighters at \$2, cost \$10. 5 sold at \$2.50. Total, \$12.50. Profit, \$2.50.

10 cigar lighters at \$1.75, cost \$17.50. 7 sold at \$2.50. Total, \$17.50. Profit, \$00.00.

If you buy 10 cigar lighters, the first 7 sold just pay for the stock. You must sell the last 3 to make any profit.

## STREET RAILWAY BIGGEST AUTOMOBILE USER IN GEORGIA

One hundred and six motor cars and motor trucks are owned by the Georgia Railway & Power Co. This is one of the largest fleets of motor vehicles in the state. Preston S. Arkwright, president of the company, says: "The time will come when we will be using automobiles as public transportation vehicles in territory where the business would not justify the building of rail lines."

# MOTOR AGE'S PICTURE PAGES



Twenty years old and still in the running, this old Cadillac, built in 1902, recently made an 800 mile trip, from Detroit to New York, under its own, "one lung", power. The car beside it is the latest 1923 model Cadillac. The men seated in the old timer are Lucian R. Burne, who demonstrated and sold the earliest models, and Inglis M. Uppercu, president of the Detroit Cadillac Motor Car Corp. of New York



Pilots and mechanic who handled the old Cadillac on it's long trip were men who have been with the Cadillac organization for 20 years



In sending this picture of his exhibit at the Cass County fair, J. F. Reddick of Logansport, Ind., writes: "You will note by the goods displayed that I use MOTOR AGE as a guide in buying"



When the Mitchell White Streak No. 1 completed it's 10,254 mile tour with sealed hood, the driver, Frank Zirbes, was greeted on his arrival in Chicago, by Dr. John Dill Robertson. At the right Dr. Robertson is shown breaking the seal of the hood



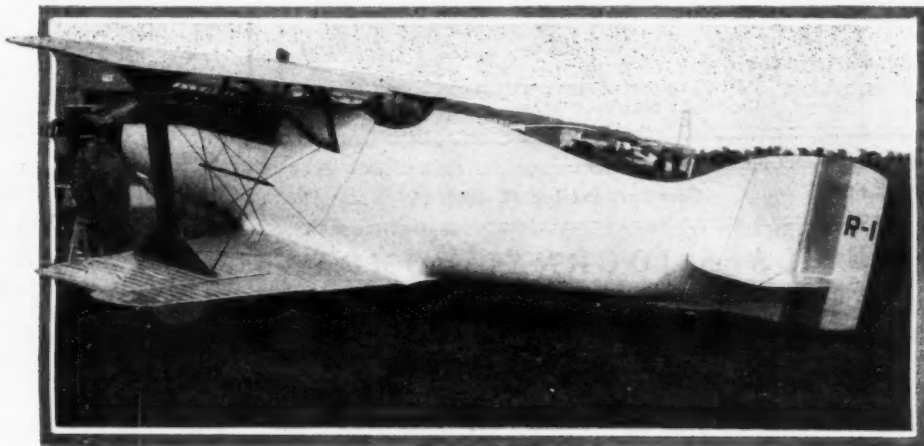
C. W. Nash and a halibut which he caught last month. While Nash and a friend were fishing for cod, off the Maine coast, this fellow joined them in the sport. The two men landed him with a couple of grappling hooks. He weighed 190 lbs. and was over 6 ft. long



# OF AUTOMOTIVE INTEREST



One of the entries in the Pulitzer Cup Race in a speed test, circling Pylon, Selfridge Field, Detroit, at 200 miles per hour



One of the leading contenders in the Pulitzer race was the same aeroplane which won the Pulitzer cup in 1920. It is a Verville Packard machine



Sir William Letts, managing director of the Willys-Overland-Crassley, Ltd., European distributors of Overland and Willys-Knight cars, who is now on a visit to America, predicts that 50,000 American made automobiles will be distributed in Great Britain in 1923. He predicts the sale of 7,000 Overland cars in Great Britain alone next year, and a few thousand more on the continent



The quaint old gallows sign at the Four Swans Inn, at Waltham Cross, about ten miles from Boston, England. This sign is one of the few original Inn signs of the "gallows" type still to be seen in English rural districts



The grandfather of the present R. & V. Knight was a pioneer among "horseless carriages," as can be seen from it's style. It was then the Moline with a 2 cylinder R. & V. engine. When the little disc on the side was turned to uncover the crank ratchet, the spark was automatically retarded, preventing back-fire—a strong selling point in "them days"



# MOTOR AGE

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## Continuing the Tire Discussion

THE more we investigate this question of retailing tires, the more we are convinced that those who talk in generalities about the tire business going to the dogs are wrong. There are many merchants in this country who are doing a legitimate tire business, in a legitimate way, with factories that co-operate with them.

As is the case in the newspaper item, it is the unusual and the wicked deed that gets the prominent display in the news. That is because the unusual and the wicked thing is out of the ordinary. If the tire business was all bunk, misrepresentation and swindle, there would be less attention paid to these phases of the trade. It is because this great business of supplying tires to almost 11,000,000 vehicles is bad in spots, that these spots attract so much attention.

The merchant who wants to sell tires today can find a factory that will support him in a legitimate effort, will supply him with advertising material and will recognize his adjustments as long as he is fair to himself and his merchandise.

Not all factories will do this. Some factories believe that they own the tire dealer body and soul and that he will have to do exactly as the factory or branch says, regardless of right or wrong, and if the factory chooses it will send the surplus into his district to compete with

him. Some factories will mark first class tires as seconds and compete with the dealer. Other factories will misbrand their tires and will try to give just as little for the money as possible. These are factories to be avoided. The prospective dealer should ask himself:

Has this factory co-operated with the dealer?

Does this factory make standard merchandise?

Has this factory a sufficient dealer outlet for its merchandise?

Is the sales overhead of this factory reasonable?

Does this factory spend, on branches and consumer advertising, money that should go to the dealer?

Are the sales policy and discounts of this factory reasonable and stable?

After answering these questions satisfactorily to himself through investigation among other dealers (not listening to the first salesman to come along) the dealer can enter the tire business and be assured that he will slowly and steadily gain customers from those dealers who are representing factories that have not reasonable ideas of quality, dealer policy and other vital matters.

The point of the situation is that a local reputation for honesty is the secret of tire selling.



*"He that sells upon trust, loses many friends, and always wants money."*



## The Transportation Merchant

THE part of a recent merchandising article in MOTOR AGE, which discussed the possibility of an automobile dealer selling motorcycles, has attracted much attention. In fact, some persons appeared to regard the view there presented, as to a "transportation merchant," as rather novel and perhaps a good idea.

It is rather surprising that this situation exists. There should be nothing novel to it. We have well defined lines of merchandise. For instance, the clothing merchant sells many kinds of clothing and especially in the smaller cities he is likely to sell all kinds of clothing. He has a boys' department, a workingmen's department, low priced clothing and a higher priced clothing. In fact, he is prepared to supply the clothing wants of every male prospect who enters his door. He does this because each of these lines means added income.

Just why the transportation merchant should not do the very same thing is not obvious. Certainly the objection cannot be made that the transportation merchant, as we know him today, does not need the income. In most cases he is complaining that his overhead is out of line with his sales. Why not multiply the sales?

If the small city dealer has a line of cars running from the low priced to the high priced, and adds a truck or two, a tractor and a motorcycle, he is ready to meet all prospects with a smile and say, "I am sure we can take care of you."

The objection usually is made that the dealer cannot afford to stock the higher priced cars. Some small city dealers have made a record of as high as ten sales this season without a car in stock. They have the sign, carry some parts in their maintenance department and are the local spokesmen for this car. They carry the prospect to the nearest salesroom in the lower priced car they sell and the sale is completed there. The manufacturers of higher priced cars are looking for just such dealers. Seldom do they find a community where there is not at least one of



their cars in operation and this one serves as a sample to look at, even if it cannot be used as a demonstrator.

The motorcycle, of course, can be stocked at a reasonable investment and a few sales will not only add to the income of the dealer but will make friends.

MOTOR AGE believes that the transportation merchant is coming and those small city dealers who arrange their course to this end will be ahead of those who do not see this in the future. The high priced car manufacturer and the motorcycle manufacturer are willing to lend their aid, so why not go to it?



*"In success be moderate."*



## Stop the Slaughter

THE newspapers of the last few days have carried reports of an unusual number of railroad crossing accidents, in which occupants of automotive vehicles have been killed. There has been an appalling peak of these accidents in and near Chicago and to judge by the smaller items appearing in the newspapers these accidents are quite epidemic.

It is time that the dealers began a drastic campaign to check this epidemic. They should speak freely and forcibly with their car owners, about the danger of taking a chance in crossing a railroad track when a train is approaching. Many of these accidents probably are entirely on the head of the automotive vehicle driver. In others, apparently, the driver did not take such a great chance, but stalled the engine on the tracks and the loss of life occurred in an endeavor to save the car from wreckage.

The dealer can tell his driver customers that the power from an engine is far more subtle in low or second speed than in high gear, even though much has been said these days about doing all driving on "high." The best plan for a driver to adopt upon reaching a dangerous crossing is to shift into second gear, especially when there is a steep approach to the track. Should a driver then have occasion to suddenly give the engine more throttle opening, the engine will not "stall" because the reduction in the gears will allow it to turn over fast and move the car more easily.

If the dealer will promote such understanding among his owners he may feel that he has saved a life as surely as the expert swimmer who saves a drowning person.



*"Look before or you will find yourself behind."*



## Why Not You?

THIS editorial is written especially to the car dealer in the small city who believes that he cannot afford to hire salesmen to sell cars in his neighborhood.

There was a change of ownership in a sales firm in Chicago a few weeks ago and the entire personnel of the establishment moved out, leaving a salesroom, some floor cars and a parts stock to the new owners. These owners did not have a great deal of money, at least none to waste in making a showing of false front. The two partners

in the firm found themselves very busy getting in shape for business and so they advertised for salesmen.

They employed three men, two of them experienced automobile salesmen and the other a young man who sold himself to the firm, without selling experience. These men were given no salary, merely an offer of commission. The firm had no prospect list to supply them and they were allowed to alternate on the floor with a view of picking up their own prospects. All of the salesmen were earnest and went to work. Within two weeks each had made a sale despite an almost arbitrary rule against taking in used cars. The salesmen made a living wage during the first two weeks and the profits were sufficient to carry the overhead of the firm while it was getting under way. By the time the two weeks were passed, each salesman had filed a number of prospects and was feeling good as to the future.

The idea is here. In each small town there is some ambitious young chap who would like to be a salesman. He has acquaintances and friends. He is willing and perhaps anxious to talk automobiles. If you supply him with a package of firm cards with his name written or printed on them, the chances are that he will sell some cars for you and you will not be at any expense until he makes some money for you.



*"The use of money is all the advantage there is in having money."*



## Sell 'Em With Pictures

SELLING is teaching; teaching a certain, specific person what a certain, specific thing can do for him in his particular, specific need. Teaching is the presentation of ideas in such a way that they find a responsive chord in the mind of the individual, so that from within there comes a mental picture that accords with the ideas of the salesman.

The most instructive articles, text books or lectures are usually the ones that are best illustrated, for the story of the picture is grasped more easily than the story in words. The picture of a great fire, shown in the window of a real estate office, is more effectual in teaching the need of fire insurance than an hour of argument as presented by the average insurance salesman.

In the automotive field, the graphic portrayal of a real need is similarly more effectual in selling vitally needed accessories, than a whole mouthful of words would be. In the early days of Christianity the parable was used to teach spiritual truth and the method is no less applicable today.

Where people must wait, they look at their surroundings whether they want to or not, as illustrated by the street car advertising, and if in the maintenance station, people wait at the cash register, or the glass covered counter, an opportunity is presented for this effectual method of selling.

This does not mean papering the place with posters shouting the virtues of the "One And Only This or That," or anything of the sort. It does mean, however, giving your customers something to look at that will interest and amuse, and at the same time subtly but inoffensively presenting the value of merchandise you have to sell.

# Production Keeps Up to September Rate

## Seasonal Demand for Enclosed Cars Stimulates Fall Sales

### Improved Business Conditions Throughout Country Indicates Continued Activity in Industry

NEW YORK, Oct. 23—October production is holding up remarkably well despite the difficulty experienced in getting through materials. Shipping conditions have shown little improvement in the last week, nor is any expected until the needs of the farmers in moving crops and the demands of lake ports for coal have been relieved. Detroit has met the situation through the greater employment of motor trucks to bring steel from Pittsburgh so that up to this time, there has been no curtailment of operations from this cause.

Reports for the first week of October show only a slight falling off from the output of the last two weeks in September. That this condition exists is only a little less surprising than the fact that the usual seasonal decline has not yet struck the industry and it is doubtful if it will be apparent to any degree this year. New models and a stimulated interest in enclosed cars have kept up buying to an almost unprecedented level.

Indications point to the possibility that the month will develop a total production equal to September, when the output aggregated 206,000 cars and trucks, and that it will show a gain over last October when 147,000 were produced. Such curtailment in operations as may come in some plants between now and the end of the month probably will be more than offset by the increased production of the Ford plants.

Automobile dealers are not being hampered through the lack of adequate shipping facilities. With the growing shortage of available freight cars, driveaways are being resorted to by most manufacturers and as long as good weather prevails, dealers will be rid of any concern over deliveries.

Conditions through the country as they bear on the automotive industry are generally encouraging. Particularly good are the reports coming from the south and southeast where it is predicted that, with the improvement among the farmers, a normal volume of automotive business will be established by next spring.

With truck manufacturers there has been a steady advance. While the tractor branch of the industry has taken no decided spurt it has shown marked improvement. The majority of tractor manufacturers have made headway in clearing their floors of finished stocks and

some are finding it necessary to employ extra shifts and make factory additions.

Parts makers are in a thriving condition with their financial foundation never sounder than it is now. Collections are good and orders on hand call for the maintenance of production at a peak rate.

### OPEN ACCESSORY SHOW DROPPED

CHICAGO, Oct. 23—The open show of automotive equipment which was scheduled to be held at the Chicago Armory the week of Nov. 13, simultaneously with the Automotive Equipment Association's show for its members, has been called off, it was announced today by Charles P. Hughes, promoter of the enterprise.

Hughes, formerly secretary of committees of the Automotive Equipment Association, said that lack of support by manufacturers was responsible for his decision to call off the show. A great many jobbers, he said, were very much in favor of it.

### CHEVROLET ANNEXES TWO UNITS

DETROIT, Oct. 26—The Central Products Co. and the Central Gear Co. of the intercompany parts group of General Motors Corp. have been taken over by the Chevrolet Motor Co. and will be operated as units of that company, manufacturing parts.

This marks a further step in the consolidation and unification of the many divisions and subsidiaries of General Motors, the subsidiaries having been reduced in number from 78 to 67 in the past year.

### MOON 6-40 REDUCED \$100

ST. LOUIS, Oct. 21—A reduction of \$100 on the six-40 phaeton is announced by the Moon Motor Car Co. The drop was from \$1295 to \$1195. This model is the only one of the line affected.

## Traffic Improvements Now Under Way in Chicago

CHICAGO, Oct. 23—Extensive plans for the improvement of traffic conditions in Chicago are under way. Rapid progress is being made toward the widening of Michigan boulevard from Twelfth street to Thirty-third street, extending throughout the length of the "automobile row." The street is being widened 14 feet, 7 feet on each side.

Authorization has been given by the park commissioners for the erection of three towers in Michigan boulevard to regulate the flow of traffic for a space of about 20 blocks. The expense of the towers and lights will be borne by the Yellow Cab Co., in order to give the city a trial of this method of controlling traffic.

Serious consideration is being given to the proposal of the police department for one-way traffic on the most congested of the streets in the loop. Authority for this change, which has been endorsed by the Illinois Automobile Club, will have to be given by the city council. Related to this project is the proposal to establish "express" and "local" lanes of travel in Michigan boulevard. The express lane would be separated from the local lane by a low wall, except at street intersections, with no turns or stops permitted within its extent.

### HAYNES SPORT COUPELET

KOKOMO, Ind., Oct. 23—A new Model 55 sport coupelet has been added to the Haynes 1923 line. The price is \$2,095. It carries three passengers, has complete sport equipment and is finished in Haynes coach blue. The equipment includes six disk wheels with six cord tires, a trunk on a trunk rack at the rear, nickel plated radiator and headlamps, Moto-Meter and sun visor.

## Comparative Production of Cars and Trucks for First Nine Months

WASHINGTON, Oct. 25—Figures received by the Department of Commerce through the Bureau of the Census place total production of passenger cars in September at 186,562, compared with 249,225 in August, and of motor trucks at 18,843 as against 24,200 in August. While the September production is the lowest since March, it is considerably above the figures for September, 1921, when 144,669 passenger cars and 13,648 motor trucks were produced.

The following table gives the total output for each of the last nine months. With a few exceptions the reports each month are from identical firms and include approximately 90 passenger car and 80 motor truck manufacturers. September figures are subject to slight revision when all reports have been received.

1922	Passenger cars	Trucks	Total
January	81,693	9,416	91,109
February	109,171	13,195	122,366
March	152,959	19,761	172,720
April	197,216	22,342	219,558
May	232,431	23,788	256,219
June	263,027	25,984	289,011
July	224,057	21,357	245,414
August	249,225	24,200	273,425
September	186,562	18,843	205,405
	1,696,341	178,886	1,875,227



## Farm Equipment Men Learn From Automotive Industry

### Manufacturers and Dealers, in Annual Conventions, Get Merchandising Ideas

CHICAGO, Oct. 23—After 50 years during which the goods they made were taken away from them without effort because agriculture was growing and needed the tools wherewith to develop, the implement industry is at last getting some glimmerings of the truth that henceforth farm implements must be merchandised.

This was revealed at the twin conventions held in Chicago last week. One of the two gatherings was the annual convention of the National Association of Farm Equipment Manufacturers, composed of the farm implement manufacturers of the country; the other was the annual convention of the National Federation of Implement Dealers' Associations, composed of delegates from the organized retail implement dealers of the country.

There was no special significance attached to the fact that these two gatherings, representing the two elements of the implement trade, met here at the same time, but it happened that the Federation adjourned its session on Wednesday afternoon and attended the convention of the manufacturers in a body. This was significant, for it provided an opportunity for the two elements of the trade to size each other up en masse, and the dealers by no means suffered in the comparison.

Earlier in the day the attitude and expectations of the manufacturers had been voiced by Floyd R. Todd, vice-president of Deere & Co., and the recognized spokesman for the implement manufacturers. His opinion of the future of the industry is that it will have another twelve months of depression to pass through before anything like a return to normal conditions is experienced and that trade will not be good until after the beginning of the year 1924.

That the retailers take practically the same view of the future was revealed in the address of R. A. Lathrop, president of the Federation, who, in addressing the manufacturers, said that it would be safe neither for the farmer to buy implements nor for the dealer to sell implements for the next year or so.

This attitude of both manufacturer and dealer is the more surprising from the fact that alongside of the implement business there has grown up a kindred business, namely, that of selling automobiles, which is demonstrating that the farmer is again in the market, that he is buying, and that it is not only feasible but safe to sell him. Inasmuch as a very large element in the retail implement field is also a factor in the au-

these dealers manifest up-to-date and progressive merchandising methods in their automobile department and retain the archaic methods which have been in vogue for half a century in their implement department.

But that some of them are waking up to the realization that it is possible for the implement industry to get back into line in the near future was indicated by the demand on the part of the retailers that the manufacturers not only resume their advertising in trade and farm papers, thus to re-inspire confidence in the industry, but that they adopt the plan of advertising f.o.b. factory retail prices, so that the retail dealers may resell at these prices, plus the freight, just as automobiles are sold now. This



J. B. BARTHOLOMEW

President-elect, N. A. F. E. M.

tomobile business, it is to wonder why is taking a leaf out of the automobile merchandising book, and is also meeting the catalog house competition in the most effective way.

Guy H. Hall, Director of the Institute of Progressive Farming, in his address before the manufacturers' convention, not only effectively, but dramatically presented the facts he had gathered from all elements in the country having to do with influencing the farmer to better methods and with merchandising him the wherewithall to improve his methods and left the inescapable inference that all that was needed at the present time or in the immediate future to develop the farmer market was merely to employ up-to-date merchandising methods.

The inklings of the truth that seeped through into the minds of the retailers, as indicated by their resolutions addressed to the manufacturers, and the incontrovertible facts presented by Hall, which must have a profound effect upon both manufacturers and retailers, are the very best augury that the implement

## Chicago Enclosed Car Show Closes; Dealers Well Satisfied

Chicago, Oct. 23—The First Annual Enclosed Car Show of the Chicago Automobile Trade Assn. closed Oct. 22 and if interest aroused, attention attracted and prospects gathered, means anything in the merchandising of automobiles, then this show was a success.

Virtually every dealer who participated in the exhibition, is satisfied with the outcome. Attendance, especially in the medium-priced car salesrooms, has been most gratifying and not only sales but salesmen as well benefited by the show as a stimulant. Dealers in outlying districts as well as on "the row" have worked hard for success and the effects of the event, will, it is thought, be felt until the spring brings the "big tent" affair at the Coliseum.

A big portion of the visitors were owners of open cars and it was from this field that the largest number of sales were made. The interest manifested by women was also a noticeable result.

### RECEIVERS FOR PAN MOTOR CO.

ST. CLOUD, Minn., Oct. 21—E. E. Clark and R. L. Gale have been appointed by Judge J. A. Roeser, of the district court, as receivers for the Pan Motor Co., a manufacturing concern of this city. This action was upon application of creditors of the company following a suit brought for \$30,000 and promises of more litigation. The purpose is, conserve the property for the benefit of stockholders and creditors, and the receivers are directed to operate the plant to this end. Assets are given at \$2,633,385.63 and liabilities at \$506,061.18.

### 125 ACCESSORY EXHIBITORS

NEW YORK, Oct. 21—E. L. Heminway, general manager of the Motor and Accessory Manufacturers' Association, announces that 125 members will exhibit in the national shows at New York and Chicago. Of these 82 will exhibit in both shows, 34 in New York only and nine in Chicago only.

industry is waking up, and that by following in the footsteps of the automobile industry it will begin to acquire some new merchandising ideas which will result in bringing this great industry back into line in the not distant future.

The manufacturers elected J. B. Bartholomew, of the Avery Co., Peoria, Ill., president for the coming year and made Floyd R. Todd, vice-president of Deere & Co., Moline, Ill., chairman of the executive committee for 1923.

The Federation elected S. M. Sellers, of the Ohio association, president for the coming year, and gave the vice-presidency to T. M. Whitten of the Mississippi Valley association.

## Engineering Phases of Modern Car Discussed by Kettering

**Height and Weight of Design Can Be Determined by Measuring Car, He Says**

CHICAGO, Oct. 21—Engineering is simply the redistribution and proportioning of old things. There has been no radical change in fuel combustion and the transmitting of its energy or power to the rear wheels of an automotive vehicle over the last 10 or 12 years. From 1909 to the present, development of the "projected" 1923 automotive vehicle, cars have stood still, excepting for the proportioning of parts. These three statements were made last night by C. F. Kettering, vice-president of General Motors Corp., in analyzing the fundamentals of engineering before the Midwest section of the Society of Automotive Engineers.

Kettering stated that essentially there are three phases of engineering: Material, economical and psychological. In the first instance, it becomes highly essential that engineers pay attention to the amount of material going into a vehicle intended to meet competition in a certain price class. Obviously, if a vehicle is designed to sell around the \$1000 mark, the material must be proportioned to meet this figure, so that later on the sales department cannot come back and state the car cannot be sold profitably at the price intended.

The economical side of engineering is practically self-explanatory. Kettering mentioned the fact that instances have been known where a certain machine tool had been designed and perfected to produce a part for a car, which part became obsolete a few weeks after the tool was finished. Then, too, the efforts of any engineer are futile if the product he has designed does not fit the human element. In other words, the buying public is the final inspector. A product must be suited to the needs of the people, to their likes and dislikes and be adapted to the vast majority, all of which leads to the last phase—psychological.

Speaking of this, Kettering said that if he were at an automobile show and were given a yardstick with which to measure the cars, he could tell the height and weight of the chief engineers who designed the cars. His point was that if a car had plenty of leg room in the front compartment, the engineer was a tall man. If one was cramped, the engineer was a five-footer, and so on. Plenty of width in the seat indicated the engineer was a heavy man. If a man struck his hat on the top when entering or getting out, the engineer was of small height. These men, he said, had lost sight of the fact that the life insurance companies could give to them the exact height, weight and any other factors of the average person, obtained from tabulations extending over many

years. Paper models could then be made and the seats and control arrangements of cars laid out to meet 95 per cent of the people.

### INDIANAPOLIS CLOSED CAR SHOW

INDIANAPOLIS, Oct. 21—Decision to hold an enclosed car show Nov. 6 to 10, inclusive, was made by the directors of the Indianapolis Automobile Trade Assn., provided a sufficient number of exhibitors could be obtained to fill Cadle Tabernacle. John B. Orman, manager of the association, obtained enough reservations to nearly fill the show building on the afternoon of the day when the decision was made, so there seems no doubt that the local association will establish a new show record. With two shows already held this year (March and the State Fair Show), the Closed Car Show will be the third automobile exhibit held in this city inside of eight months.

### STEWART-WARNER INCREASES

CHICAGO, Oct. 23—Having earned the equivalent of \$3.49 a share on its outstanding stock in the quarter ended Sept. 30, the Stewart-Warner Corp. has increased its quarterly dividend from 75 cents to \$1 a share, payable Nov. 15. Total earnings after taxes for the quarter were \$1,657,554, indicating the continuance of sales at a high point. For the first nine months of this year the profits have been \$3,514,078, equal to \$7.40 a share. This compares with profits of \$1,039,572 in the corresponding period of 1921.

## Delay in Deliveries Hinders New York Enclosed Car Sales

**Railroad Embargoes and Blockades in East Make It Hard for Dealers to Get Cars**

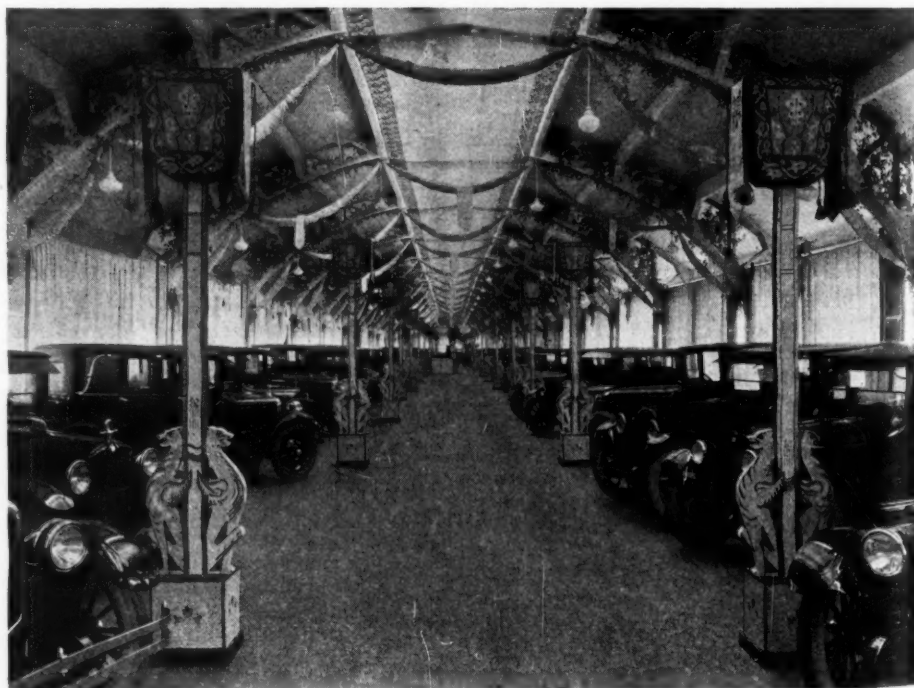
NEW YORK, Oct. 21—Crisp fall weather has helped passenger car sales in the metropolitan territory to keep going at a high level for this time of the year. The bulk of the demand, naturally, is for enclosed cars, but owing to the fact that most dealers are short of these models, there is better than a normal demand for open cars.

Only dealers in a few lines are getting enclosed cars in sufficient volume to make immediate deliveries. Railroad embargoes and delays which are in effect throughout the eastern section of the country are aggravating closed car shortage conditions, due to lack of production facilities, and dealers in some of the more popular lines are having to accept orders with delivery dates weeks and in some cases months off.

The used car market has kept pace with that for new cars. Only a minority of dealers hereabouts are overstocked with used cars. As might be expected, the demand for enclosed used cars is brisk and there are practically no accumulations of stock in this class.

The truck market is showing gradual but steady recovery. Dealers in the more popular makes report sales running 50 to 100 per cent ahead of what they were a year ago.

## Detroit Show Attracts Buyers



DETROIT, Oct. 21—Automobile interest in Detroit this week centered in the enclosed car show held in the exposition hall of General Motors Building under the auspices of the Detroit Auto-

mobile Dealers' Association. Attendance ran to capacity each day, the paid admissions approximating 30,000 for the five-day show. As an interest producer the show was extraordinary.



## Minneapolis Automotive Interests Are Organized

### Alliance Plans Action on Legislation and Co-operation in Business

MINNEAPOLIS, Oct. 23—For common protection and advancement of good citizenship and proper legislation at the coming session of the Minnesota legislature is the motive in an alliance of the automotive industry in Minneapolis, formed at a massmeeting Oct. 17. The name is the Allied Automotive Industries, as adopted by representatives of every factor in the business, from motor car and tractor companies to automobile insurance agencies, including the radiator men, paint men, body men, and much allied forms of business.

A tribute was paid to Walter Wilmot, many years active secretary for the Minneapolis Automobile Trade Assn. and manager of the annual winter and fall shows in the Twin Cities and at the State Fair grounds, in his choice as secretary. The association offered the services of Wilmot and the use of his offices for one year. Constitution and by-laws are similar to those of the Ohio State Automotive Trade Association, and the organization does not propose to displace the present separate trade organizations.

Officers elected are: President, J. H. W. Mackie, general manager for the Payne Motor Co.; vice-presidents, L. G. Wilcox, manager of the Motor Maintenance Co.; and E. P. Farley of the Farley Tire Co.; treasurer, Austin S. Velle, treasurer of Eckland Bros. Co., body builder. Two hundred attended the mass meeting and a membership of 400 is urged.

President Mackie outlined four purposes of the new organization—better acquaintance, business cooperation, common protection, civic and state usefulness.

To make good the general purpose of the organization of affiliating all the allied industries the board of directors will be made up of two representatives from each of varied trade organizations and six at large, to be chosen at the next general meeting.

### HOLMES INVESTORS COMMITTEE

MILWAUKEE, Wis., Oct. 21—Wisconsin holders of securities of the Holmes Motor Co., Canton, O., have formed a protective committee, following the receivership proceedings instituted against the corporation. It is stated that approximately \$250,000 of the Holmes company's two-year bonds, sold with a bonus of common stock, were disposed of in Milwaukee and immediate vicinity. Orson Towle, who was in charge of the stock-selling campaign here, has been under arrest five times on charges of larceny as bailee and embezzlement since February. He is said to be no longer connected with the

Holmes company. George F. Moss, president of the Western States Envelope Co., Milwaukee, has been appointed chairman of the local protective committee, which has asked all holders of securities to deposit them with the First Wisconsin Trust Co., Milwaukee, while efforts are made to recover. The committee had an appraisal made of the Holmes property, which reveals assets of \$600,000, not including the worth of valuable patents on its air-cooled motor design. It is stated that while the issue of two-year bonds was in the sum of \$750,000, only about \$400,000 was actually sold and more than half of this amount was disposed of in Milwaukee.

## Salesmen Must Call On Owners Once a Month

LOUISVILLE, Ky., Oct. 23—Believing that satisfied customers are an automobile dealer's greatest asset, O. K. Motors Co., Studebaker distributor, has instructed its salesmen to call on every owner once a month and ascertain if the car is giving complete satisfaction.

In most instances no complaint is made, but sometimes merely an adjustment is needed and the new owner is made happy. By the same token, he is always a booster for the car.

### SNOW REMOVAL PLANS

WASHINGTON, Oct. 23—Winter travel by automobile in the central and northern states, heretofore hampered by snow covered roads, will be made possible in the future, if plans of the Bureau of Public Roads, of the Department of Agriculture, can be consummated.

Through the co-operation of the State Highway Commissions, the Bureau hopes to utilize surplus war equipment, such as tractors and grading plows, to be employed in the removal of snow and sleet from the main arteries of the public highways, during the winter, to the end that automobiles may have the use of the roads through the greater part, if not all of the winter.

### LOCOMOBILE WILL SELL

BRIDGEPORT, Conn., Oct. 23—At a hearing before Referee John Keogh, creditors of the Locomobile Co. of America gave unanimous consent to the receiver's proposal to sell the plant and assets of the company at a private sale. Approval of the Court is now the only step necessary to wind up the company's affairs.

Elmer Havens, the receiver, has indicated that W. C. Durant's offer of \$1,750,000 would be accepted.

### ELGIN COMPANY AT ARGO

In the story of the receivership of the Elgin Motor Car Corp., in the Oct. 19 issue of MOTOR AGE, the address of the company was erroneously given as Elgin, Ill. The plant is at Argo, Ill.

## Kansas City Dealers Elect Officers at Annual Meeting

### New President, Nelson S. Riley, Is Authority on Used Car Question

KANSAS CITY, Mo., Oct. 23—The annual meeting of the Kansas City Motor Car Dealers' Association, held October 16, produced besides the election of officers, action on many projects indicating aggressive programs for the coming year.

The election was significant. Nelson Studebaker Riley was elected president. The importance of this event lies in the fact that Riley has been chairman of the "Used Car Committee" of the association, and as such is largely responsible for the marked progress made in used car matters in Kansas City. He has given a great deal of time to this subject, and his personal work, has resulted in a radical accession of cooperation in tackling the subject. It can be said that his election reflects the purpose of the association to apply Riley's ideas in the coming year, regarding used cars. One important tenet of his program is said to be the elimination of the sense of dread of the used car, which feeling embraces the traditional effort to buy used cars of prospects.

Riley was president of the association several years ago, when he was branch manager for the Studebaker Corporation of America, at Kansas City.

Sam W. Ramsey was elected vice-president. He is president of the Midwest Oldsmobile Co., and was active in the local association several years ago, while manager for this territory for Willys-Overland, Inc.

Both Riley and Ramsey were on the board of directors of the association the past year.

The directors elected, all new this year, on the board, are:

A. L. Elwood, Elwood Motors, Inc.; W. H. Morgan, Nash Motor Sales Co.; A. P. TenBrook, manager Oakland Motor Car Co., branch; Arthur Bunker, Bird-Sykes-Bunker Co.; Geo. W. Cox, Willys-Overland, Inc.; W. C. Howard, W. C. Howard Motors Co.; and E. P. Moriarty, Moriarty Motor Co.

### JORGENSEN CO. IS RESUMED

WAUPACA, Wis., Oct. 23—The business of the defunct Jorgenson Mfg. Co. of Waupaca, Wis., manufacturers of priming devices and other brass specialties for the automotive industries, is being resumed by a new \$75,000 corporation under the name of Acme Brass & Metal Works, Inc. The new concern has completed the purchase of all of the assets, including plant and equipment, from the receiver of the Jorgenson company. All of the interests are new and consist of Waupaca and Appleton business men.

## Wisconsin Production Schedules Settle Down to an Even Pace

### Truck Manufacturers Find Steadily Improving Market; Busses Going Good

MILWAUKEE, Wis., Oct. 23—Production schedules in practically all branches of the automotive industry have settled down to an even pace on the basis of contracts that will probably cause no marked variation in volume until the holiday vacations. So far as passenger car builders are concerned, they are operating as well as the September average and orders from distributors and dealers are absorbing output steadily, while on enclosed types, factories are still far behind and see little hope of catching up with deliveries until the end of the year.

Motor truck manufacturers are finding a steadily improving market, both for freight carriers and passenger vehicles of the motor bus type. The latter has come to be a distinct feature of business. The call for freight trucks covers the general range, with the  $\frac{3}{4}$  to 1-ton, and the 3 to 3½-ton vehicle moving probably best at this time.

### Engine Shops Busy

Engine shops are very busy and operations are at least as good, if not somewhat heavier than the summer average, due to good orders for current as well as future delivery. Heavy duty engines for trucks are in better request than at any time this year. It is apparent that the motor truck trade is laying foundations for increased production in anticipation of a much better market as the business of this country comes to a more complete realization of the critical situation of railroad transportation, especially when winter makes the present serious condition far worse.

The railroad freight situation is more unfavorable than before, but motor transport facilities are being put to good use, especially on short hauls. This method is coming into greater use regardless of the railroad situation.

### SAN FRANCISCO DEALERS ELECT

SAN FRANCISCO, Oct. 23—William L. Hughson, pioneer Ford dealer of the Pacific coast and with branches in Seattle, Portland, Oakland, San Francisco, Los Angeles and San Diego, has been again elected president of the San Francisco Motor Car Dealers' Association. He was its organizer and served as president three years ago. P. L. Emerson was elected vice-president, G. A. Urkuhart, secretary, and A. D. Plughoff, treasurer.

### PEORIA SHOW BEST IN YEARS

PEORIA, Ill., Oct. 23—Peoria dealers are enthused over the excellent results from the annual display of motor vehicles at the National Implement show. The display far eclipsed any of the previous exhibits at Peoria's great fair and

occupied 36,000 square feet in Machinery hall, nearly twice the space of previous years. Over one hundred cars were on display, the total value of the vehicles and accessories being estimated at \$200,000.

## Nebraska Garagemen Enter Livestock Transport Work

OMAHA, Nebr., Oct. 23—The garagemen of the small towns within 100 miles of Omaha are branching out into a larger branch of the industry.

A few of them have installed a small fleet of light trucks and with the motto, "From your farm to the So. Omaha market without the railway," they are doing a good business in live stock hauling.

A record in truck transportation of livestock to the market is being broken every day and it has been said that by the first of the new year, hundreds of garagemen in this territory will be hauling live stock to the So. Omaha market.

### 54% FRANKLIN DRIVEAWAYS

SYRACUSE, N. Y., Oct. 24—Owing to the present railroad congestion, and in anticipation of the fact that the condition will become worse, the Franklin Automobile Co. has asked all dealers within a reasonable driving radius of Syracuse to drive cars from the factory instead of having them shipped by freight.

This will permit the use of such cars as the railroads can furnish for shipments to far away points.

During the recent railroad strike an unusually large number of cars were driven from the Franklin factory. According to traffic manager C. D. Holmes of the Franklin Co., 54% of the cars which left the factory in September were driven away. Driveaways during September of last year constituted only 29% of the total shipments for the month.

### CAR SALES RUN HIGH

SPRINGFIELD, Mass., Oct. 26—Cars sales have run large in this territory in the first half of October, especially in the low and medium priced makes. Improved in general business has resulted in stimulating sales of low-priced cars especially, restoring normal proportions as compared to the costlier makes, and has also wrought a great improvement in the sale of trucks. Deliveries are coming better, but there are few agencies having a normal supply of cars in their showrooms. An improved prospect as regards measures for keeping highways open the coming winter is helping somewhat to encourage fall selling.

### SPACE SOLD FOR A. E. A. SHOW

CHICAGO, Oct. 20—Two hundred and sixty-five spaces have been allotted to 212 exhibitors for the annual show of the Automotive Equipment Association which will be held at the Chicago Coliseum Nov. 13 to 18, inclusive. Only members of the association will be permitted to exhibit or attend the show.

## Industry Due for Second Inflation Period—Reeves

### N. A. C. C. Official Gives Three Reasons; Says Time Won't Be Long

WASHINGTON, Oct. 24—The automobile industry, and all industry in general, is due for a short "secondary period of inflation," which will not be severe and which may not last long, according to the prediction of Alfred Reeves, general manager of the National Automobile Chamber of Commerce, following a two day conference with government officials and members of the District Federal Reserve Board.

This secondary period of inflation, however, in the opinion of Reeves will have little effect upon the automobile industry for three reasons. There are, he states:

First, because the automobile industry is going to profit from "dammed up buying." These "dammed up buyers" he characterizes as those who wanted to buy automobiles last year but did not do so, waiting for prices to come down.

Second, there is a more general use of automobiles in smaller cities, as actual necessities in the matter of transportation, and

Third, because of the inadequacy of the railroad facilities, and the recent strike which taught the general business public, the advantage of automotive highway transportation.

### KROH ADDRESSES SERVICE MEN

OMAHA, Neb., Oct. 6—A. R. Kroh of the Goodyear Rubber Co. addressed the sales and service staff of the Nebraska Oldsmobile Co. at a dinner at the Rome Hotel here.

Addressing the salesmen and service men, he urged them to read the trade papers, and not to work so many hours a day or do just so much work each day, but work with the idea of service, and in this way develop themselves with profit in the industry. "There are more calls for men of proven ability in the industry than can be filled," he said. "There are more failures due to lack of knowledge than for any other reason."

### GASOLINE REDUCED TWO CENTS

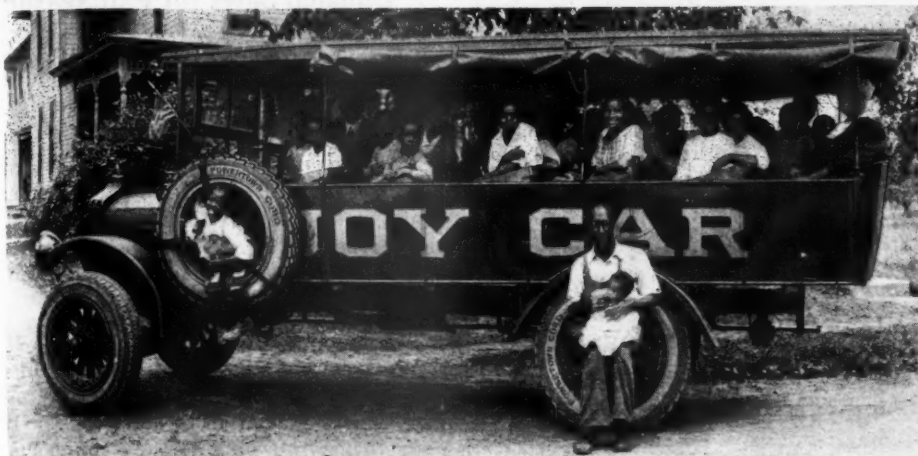
CHICAGO, Oct. 19—Reduction of two cents a gallon in the price of gasoline was announced this week by the Standard Oil Co. of Indiana, effective in 11 middle western states. The new price in Chicago is 19 cents from tank wagons and 21 cents at filling stations.

### OLDS SERVICE MEN MEET

DETROIT, Oct. 23—Seventy service men representing the larger distributors and dealers of the Olds Motor Works attended the annual factory conference and demonstration this week. R. K. Jack, head of the engineering department, talked to the service men on engineering features.



## "Joy Car" Brings Motoring Delights to the Poor



ROCHESTER, N. Y., Oct. 24—A "joy car" is being used by the Church Extension Society of Rochester, to bring happiness to hundreds of aged persons, orphans and needy children and their parents. A fund was raised by George K. Beach of the society to buy a Selden chassis upon which a sight-seeing body was constructed. The bus was named

"joy car" and it makes regular trips to the lakes, parks and other places of recreation, always loaded with children or old people who otherwise would not be able to enjoy the outings which are so accessible to owners of automobiles. In the photograph, the "joy car" is shown loaded with passengers from the Dorsey Home for Colored Children.

## Nine Plants to Make Durant Products in U. S.

DETROIT, Oct. 20—Nine plants are provided for the manufacture of Durant products, seven of which are now complete, according to a statement in the "Durant Success," the company house organ the first edition of which has just been issued. The Muncie, Ind., plant will make Durant sixes; Oakland, Cal., Durant fours; Elizabeth, N. J., and Lansing, Mich., Durant fours and Star cars; Long Island City, Durant fours and Flint sixes; Bridgeport, Conn., Locomobiles and Mason Road Kings; Flint, Mich., Mason road kings.

Additions to Leaside, Toronto, Ont., for the building of Star cars in addition to the present production of Durant fours, and an entirely new plant at Flint, Mich., for the exclusive manufacturer of Flint sixes will be complete, and begin operation Jan. 1, 1923, the statement declares.

### AERONAUTIC ASS'N CHARTERED

DETROIT, Oct. 26—The National Aeronautic Assn. became a reality this week with the official filing of a charter under Connecticut laws, and the adoption of a constitution and by-laws by which it will function as a national organization whose primary aim is to make the United States "first in the air." The association will endeavor to promote civil and commercial aviation largely through the encouragement, by the government, of private enterprise in the carrying of mails.

Howard E. Coffin, vice-president in charge of engineering of Hudson Motor Car Co., was named first president of the association. Coffin is widely known for his interest in aviation and for his

services to the government during the war in the development of its air program. He acted as chairman of the executive committee of the advance committee on organization of the aeronautic bodies. The association plans a membership of 19,000 in its first year, divided into eight classes.

### TO ASK EXAMINATION LAW

PHILADELPHIA, Oct. 24—The traffic committee of the Chamber of Commerce will cooperate with other organizations throughout Pennsylvania in the coming elections, to work out a plan for submission to the legislature which will demand that every driver of a motor vehicle take both a physical and mental examination before he is allowed to continue to drive.

### ANOTHER GAS REDUCTION

NEW YORK, Oct. 21—The price of gasoline has been reduced one cent by the Standard Oil Co. of New Jersey, the Standard Oil Co., of Ohio and the Texas Co. A reduction of three-fourths of a cent have been made by the Oil City refiners.

### TO DISTRIBUTE DUESENBERG

Chicago, Oct. 20—The Detroit Electric Car Co., 2416 Michigan avenue, Chicago, has been awarded the distributors' franchise in this territory of the Duesenberg company. Various models of the Duesenberg company are already on display at the Chicago agency's salesroom.

### WILLYS-KNIGHT TAXICAB

TOLEDO, Oct. 23—The Willys-Overland Co. is now producing a Willys-Knight taxicab, using a specially built body and chassis.

## W. Virginia Dealers Hold Annual Meet at Clarksburg

Officers Elected; Organization Good Is Shown in Record of Past Year

CLARKSBURG, W. Va., Oct. 23—Seventy-five delegates from all parts of the state attended the third annual convention of the West Virginia Automobile Dealers' Association, which was held here yesterday, concluding with a banquet at the Waldo Hotel, served to the visitors by local dealers. R. C. Helmick, of Clarksburg, was elected president, and a vice-president was elected for each congressional district.

Among the achievements of the past year, it was pointed out by officers, was the elimination of the "curbstone dealer" from the automobile selling business of the state and the establishing of a practice which makes it mandatory for a dealer to have a recognized place of business. Another achievement of the past year has been the development of a better spirit of co-operation among automobile dealers of the state to the end that the business has been established on a higher plane and relations with the buying public are more cordial. Legislation to protect the dealers from unfair competition was also discussed and possible courses to pursue in securing this were outlined.

The association went on record in endorsing suggestions for changes in the automobile laws of West Virginia.

### GASOLINE CONSUMPTION BIG

WASHINGTON, Oct. 19—Domestic consumption of gasoline in August was 583,687,932 gallons, a record total. It compares with 566,111,829 gallons in July and 503,513,463 gallons in August, 1921, according to U. S. Bureau of Mines.

The average daily consumption was 20,063,164 gallons in August compared with 20,213,193 gallons in July, the reduction being due to the fact that exports decreased about 13,000,000 gallons in the aggregate. Production of gasoline in August was 549,958,376 gallons, against 569,711,415 gallons in July and 431,577,195 gallons in August, 1921. Imports were 2,829,062 gallons against 4,840,098 gallons in July and 5,097,399 gallons in August, 1921. Exports were 35,747,004, compared with 58,630,402 gallons in previous month and 47,830,586 gallons in August, 1921.

### FALL SHOW AT SPOKANE

SPOKANE, Wash., Oct. 23—Plans for a fall season automobile show as one of the principal attractions of the Western Royal Live Stock Show, to be held at Spokane Oct. 28 to Nov. 2, were announced recently. Details of the show are being worked out.

## Fifty Accessory Makers Stage Show at Hardware Men's Meet

**Discussions Show That Interest in Automotive Equipment is Increasing**

ATLANTIC CITY, N. J., Oct. 20—Approximately 50 manufacturers of automotive equipment staged exhibits in a hotel here during the conventions of the National Hardware Association and the Automobile Accessories Branch of that association. The equipment manufacturers also took part in the discussions of the automobile accessories branch, making suggestions to the hardware jobbers for development of their own and their dealers' business in automotive products.

The discussions, participated in by hardware jobbers as well as automotive equipment manufacturers, indicated a growing interest on the part of the hardware trade in the profit making possibilities of automotive equipment.

Representatives of the National Retail Hardware Association spoke, attributing sluggishness in the development of automotive equipment retailing in the hardware field to some extent to failure of hardware jobbers' salesmen properly to sell it.

There were several attempts to estimate the volume of automotive equipment business done by the hardware trade. One jobber said that less than 10 per cent of his dealers handled accessories, while several others placed the figure considerably higher, stating, however, that the bulk of their wholesale sales of equipment were to automobile dealers and garage men. A. D. Williams, sales manager of the X Laboratories, New York, gave an interesting summary of a canvass he had made in various sections of the country among jobbers, to determine the relative volume of their trade among hardware and automobile men. His analysis showed that these jobbers sold 48 per cent of their volume to garage men, 19 per cent to accessory dealers, 17 per cent to car dealers, 15 per cent to hardware dealers and less than 1 per cent to department stores.

Manufacturers who spoke at the meeting included the following: Frank T. Chase, of the Frank Mossberg Co., Attleboro, Mass.; M. H. Tisne, of A. Schrader's Sons, Inc., Brooklyn, N. Y.; Harry Stone, of the Automotive Products Corp., Hazelton, Pa.; H. D. Laidley, of the Federal Miniature Lamp Division of the General Electric Co., Chicago; B. M. Asch, of Asch & Co., manufacturers' sales agent, New York, and John E. Lambert, of the Pratt & Lambert Mfg. Co., Detroit.

### BUSSES USED FOR WORKERS

MILWAUKEE, Wis., Oct. 23—To accommodate the large number of workmen employed by the Nash Motor Co.'s four-cylinder car works in Milwaukee, and

men engaged in building the new LaFayette works adjoining this plant, as well as further extension of the Nash factory, the Milwaukee Electric Railway & Light Co. has installed four large passenger busses to operate between the end of its city line and the Nash-LaFayette works. Passengers pay the regular city fare of 7 cents and have the usual transfer privileges. The street car company has installed motor busses on several other lines in Milwaukee to avoid the heavy expense of laying tracks and building overhead work for car operation.

## N. A. C. C. Names Committees for Service to Industry for 1923

NEW YORK, Oct. 22—Many of the leading automotive executives are on the roster of the National Automobile Chamber of Commerce, to serve the industry during the coming year. The men named on the various committees will devote their time to such subjects as highway development, taxation, advertising and other topics related to motor transport.

Chairmen of the committee are as follows: Advertising, Edward S. Jordan; hand book, E. T. Strong; insurance, Wm. E. Metzger; motor fuels, John N. Willys; foreign trade, J. Walter Drake; highways, R. D. Chapman; legislative, H. H. Rice; motor truck, Windsor T. White; passenger car show, H. M. Jewett; passenger car standards, N. E. Wahlberg.

Other committees having to do with patents, taxation, truck standards, service, traffic and educational work have also been appointed.

### WILLYS PREDICTS BIG YEAR

CLEVELAND, Oct. 19—John N. Willys, a veteran of the automobile industry, gave an answer to those timid folk of the sales end who are wondering just what will happen next year in view of the unprecedented number of cars that were sold in the present year.

Willys' answer is "I say there will be between 2,500,000 and 2,600,000 cars produced and marketed in 1923, and of this number 1,900,000 will be replacements. Some of the companies which are in the field today will vanish during this coming year. But there will be autos sold. A year ago we were laughed at when we made the prediction that automobile production for 1922 would total 2,250,000. At the end of this year the figures will show an output of between 2,250,000 and 2,300,000."

The above statement was made by Willys when he came to Cleveland last week to help Walter E. Wright start his new company here on the campaign for Overland Willys business. Wright recently took over the business of the Toledo corporation in this city and his headquarters at 3622 Prospect avenue were opened and dedicated recently.

### SUPREME MOTORS BANKRUPT

CLEVELAND, O., Oct. 21—With liabilities of \$1,067,099 and assets of \$238,653, the Supreme Motors Corporation of Warren, O., has filed a petition in bankruptcy in the Federal court.

## Dealers in Wisconsin Report Unusual Sales for Fall Season

**Buick Demand Still Greater Than Supply and All Lines Show Marked Improvement**

MILWAUKEE, Wis., Oct. 23—Within the memory of the oldest established dealers in Milwaukee there has scarcely been a time when retail sales have been so active as in the month of October, comparing the period with corresponding seasons in the past. In some respects trade is more active than it was in July and August. Dealers in the interior report that they are selling more cars now than during the summer, but volume is not quite equal to the average of April and May.

The relative briskness of trade is making more serious the problem of used cars. Demand for new cars is predicated just as much upon exchanges as before, and at the same time the disposition of used cars is much more difficult, despite the fact that resale prices are extremely low. Allowances being made by dealers are the smallest on record, and they are offering these machines at commensurately low prices. New car prices appear to be much too attractive to turn the desires of prospective buyers to used cars at any price.

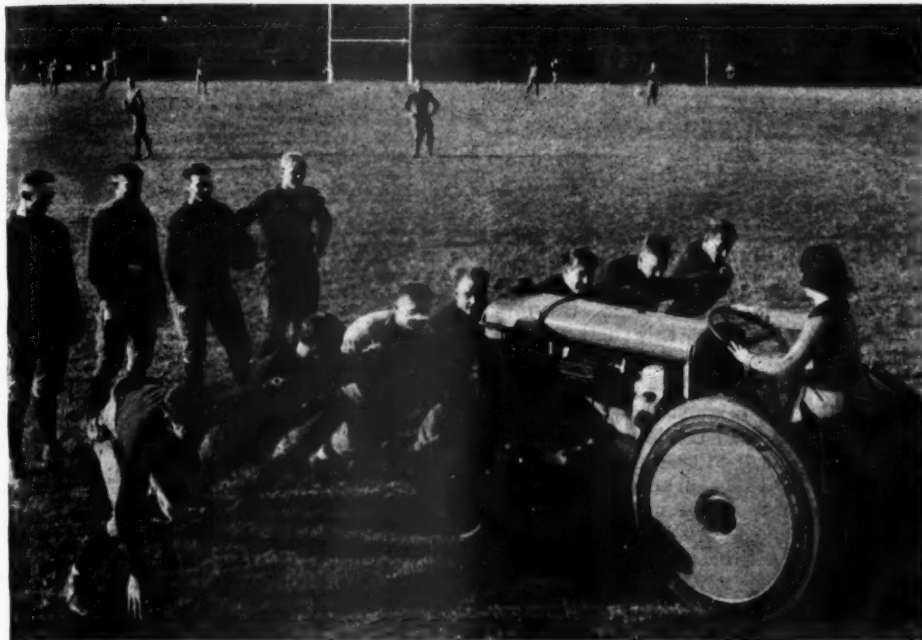
### Ford Reduction Well Discounted in Advance

The \$50 reduction in Ford prices announced Oct. 17 was pretty well discounted in advance, although surprise was caused by the extent of the cut. Opinion generally was that by lopping \$25 from the price, Ford would be achieving his purpose. Sales since the reduction was announced have increased in a gratifying manner, but hardly at the rate that might be expected with so drastic a reduction. The fact is that people have been buying Ford cars freely and few have been holding off to await the cut. The situation of Ford dealers on this reduction was much better than on the occasion of past cuts, with respect to the stock of cars on hand. Since the short intermission of Ford production, Milwaukee dealers have been practically sold out day by day and booking orders for future delivery.

Buick is a good example of a popular car, the demand for which is still greater than the supply, even in respect to open models. Despite regular shipments from Flint to Milwaukee, it is necessary for dealers to go to the factory with crews once or more times each week, as the supply of the local branch is wholly inadequate to meet current sales. The pressure is greatest, perhaps, owing to the fact that the demand runs mainly into the special sport models and enclosed cars, but it is also true that open cars cannot be delivered as fast as orders are booked.



## Bucking the Line



SAN FRANCISCO, Oct. 21—Much California beef was required to hold the tractor at bay. The demonstrator for the implement who accompanied it when it met with the scrimmage line of the varsity eleven, had hopes that it would make the crowd of young huskies look a trifle weak but it didn't. No goals or touchdowns were scored by either side.

## Chalmers Reorganization Now Under Way in Detroit Plant

DETROIT, Oct. 21—The consent of Chalmers note holders to the plan by which the company will become an integral part of the Maxwell Motor Corp. properties marks the first development in the reorganization movement, President W. H. Wilson of Maxwell said. Several more weeks will be required to work out the final plans, and when these are complete the company will announce its plans for the development of the Chalmers line.

Production of Chalmers for the past six months has been on a limited scale, owing to the determination of Wilson to hold its operations to a basis in keeping with its financial position. This scale of operations was lower than sales requirements and was not extensive enough to meet its financial obligations, though sufficient to meet ordinary operating expenses and yield profit. Under this operating plan the large stock of materials on hand when the plant came under Wilson control has been practically cleared out.

### BUICK RED LETTER DAY

DETROIT, Oct. 23—Thursday, Oct. 12, 1932, goes into the records as the red letter day in the history of the Buick Motor Co. On that day, a total of 775 Buick cars were turned out in the Flint and Detroit plants, this figure exceeding by 23 cars, the best previous days' production of these two plants.

In September, the average Buick production, including that of the Canadian factory, was 748 cars per day with a

total for the month of 16,842. October, President H. H. Bassett declares, is practically certain to greatly surpass that remarkable accomplishment.

A gratifying feature of the great Buick sales volume lies in the fact that the demand seems to be uniform throughout the United States, for, as Bassett points out, it shows that all sections now have both the ability and inclination to buy.

### BETTER BUSINESS IN MISSISSIPPI

CLARKSDALE, Miss., Oct. 21—Plans are being formulated for an extensive automobile show to be given in Clarksdale on Nov. 2, 3 and 4 in the quarters of the Alcazar garage.

The show will be under the auspices of the Clarksdale Associated Retailers and will be the first one of its kind ever given in this section of Mississippi. A parade will precede the opening and prizes will be given for the "tackiest" and the best decorated cars.

Conditions in and around Clarksdale are much improved and an excellent business is expected through the fall and winter months.

### CALIFORNIA DEALERS MEET

SANTA BARBARA, Cal., Oct. 23—The California Automotive Trades' Assn., at the annual meeting held here, voted to drop all members who do not pay dues and also those who are convicted of fraud in the management and running of their business. A vigorous campaign was inaugurated to uncover those garage-men who are indulging in the practice of overcharging for work. H. S. Mason was chosen as president.

## Springfield (O.) Plants Reach 86 Per Cent of Normal Output

### I. H. C. Receives Two Foreign Orders; Westcott Going Strong

SPRINGFIELD, O., Oct. 20—Two foreign orders were received by the Springfield works of The International Harvester Co., during the last week, one from Sidney and the other from Brisbane, Australia. These are for speed trucks with the right hand drive. The production at the plant is averaging 35 trucks per day. Recently there have been many driveaways to points as far away as Atlanta, Ga.

More orders are in now at the plant of The Kelly-Springfield Motor Truck Co. than at any one time during the year, P. H. Peitsch, acting general manager, states. By the last of the month, production will be speeded up. Mr. Peitsch has just returned from Pittsburgh where he found that conditions were steadily improving.

The Westcott Motor Car Co. is enjoying a big fall business. Production was increased during the last week. Fifteen distributors visited the plant last week. There were numerous driveaways. E. H. Gilcrest, sales-manager, returned Monday from a trip through the East where he conferred with the dealers and branch managers.

A recent survey made by the Chamber of Commerce shows that the plants in Springfield are now up to 86 per cent of normal on a five and a half days a week schedule.

### TWO MINNEAPOLIS SHOWS

MINNEAPOLIS, Minn., Oct. 20—Two automobile shows were held here during the week of Oct. 11 and the comparative values of the consolidated and individual show room exhibitions were tried with the favor going to the former. The two shows featured enclosed cars and sales, as a result of these shows, have been somewhat better.

What might be called "parking contests" were another feature of the shows and these consisted of parking cars in difficult places. The first prize was won by a woman who succeeded in parking her sedan between two cars, placed 18 feet apart in 10 seconds.

### FORD GETS FOREIGN SITE

LONDON, Oct. 6—(By Mail)—After negotiations extending over several months, the Ford Company in England has concluded arrangements to acquire 20 acres of land alongside a deep-water quay at Southampton for the erection of a plant which will displace the one now at Manchester, where the lease expires in a few years time.

The new plant will form the headquarters for European distribution, and it is hoped to have the building completed and the plant in operation within 12 months.

## One Billion Dollars More for Southern Farmers This Year

### Atlanta National Bank's Figures Show Big Increase in 12 Important Crops

ATLANTA, Ga., Oct. 22—An investigation of crop conditions over the South this year as compared with last year conducted recently by the Atlanta National Bank indicates that the twelve most important crops of the South will, in 1922 returns in dollars, bring to southern farmers at least one billion dollars more than the same twelve crops realized in 1921. This includes cotton which this year brings southern growers about \$500,000,000 more than in 1921, with cotton seed about \$70,000,000 more.

The same bank advises that the buying power of the southern farmer is now at a considerably higher point than it has been at any time in the past three years, in spite of the fact that much of the money he makes on this year's crops will be needed for liquidation purposes.

Banks throughout the entire South are making more liberal loans to farmers than they have in some time in the view of their financial recovery this year, and there is no difficulty whatever in borrowing money with which to purchase farm machinery or tractors, trucks or automobiles, especially if the latter are to be put to some productive use other than for mere pleasure.

What the increased buying power of the farmers means to the automotive industry in the South remains to be seen, but dealers and distributors almost invariably are looking for a normal volume of business between now and next spring.

Registration figures for the state of Georgia to October 15th, as compared with records to the same date in 1921, show a material increase this year, especially in the smaller counties where the population is principally rural.

### TEMPLAR TO CARRY ON

CLEVELAND, Oct. 24—The work of taking an inventory is still in progress at the plant of The Templar Motor Co., which was placed in the hands of Receiver T. L. Hausmen last week by Federal Judge D. C. Westenhaver.

The plans provide for the re-opening of the plant immediately after the inventory is completed. It will be run under the management of the receiver, who was given authority to do that. In the meantime, the plant's down town dealers and distributors will have sufficient cars, from the stock on hand when the federal court took over control of the plant, to supply the wants of customers.

### FORDSON WASHINGTON SHOW

WASHINGTON, Oct. 23—The Ford Motor Co. will stage a Fordson Industrial and Agricultural Exposition here on

Oct. 24 to 28. In addition to showing of the complete line of Fordson tractors, Ford and Lincoln cars, there will be 80 other exhibitors aligned with the Fordson product who will display at the same time.

### CLEVELAND MODELS LOWER

CLEVELAND, Oct. 23—A new two door sedan is added to the Cleveland six line, the price being \$1,295. This replaces the coupe. It carries five passengers and has a trunk platform and barrel type headlamps. The color scheme is gray and the individual front seats tip forward. In addition to this new model, changes have been made in the prices and equipment of the phaeton and four door sedan. The phaeton is now \$995 instead of \$1,095 and the four door sedan is \$1,495 instead of \$1,585. In both cases the reduction has been accomplished by a reduction in the amount of additional equipment which may still be had at the former price. All these bodies are Fisher built.

### PREPARE FOR SOUTHERN SHOW

ATLANTA, Ga., Oct. 21—Preparations for the 1923 Southern Automobile Show, which will be held in the Atlanta Auditorium the middle of next February, were started the latter part of October. Virgil W. Shepard will again be general manager of the show, which will be held, as usual, under the personal direction of the Atlanta Automobile Assn. Floor space for the next show will be greatly enlarged, as several companies were unable to get in for the 1922 show.

### FILMS TELL AUTOMOBILE STORY

WASHINGTON, Oct. 23—The story of the American automobile industry, through the medium of films, which have already been made by the government, in the Studebaker plant at South Bend, Ind., is to be augmented by an additional film, telling the story of the American motor. Both of these films will be distributed by the Bureau of Foreign and Domestic Commerce in foreign countries, wherever there is a potential field for the American made automobile.

### ANOTHER MOTOR BUS COMPANY

COLUMBUS, Ohio, Oct. 26—Application of the Ohio Motor Bus Co., for a license to operate busses on the Broad St.-Bryden Road line and also between Columbus and Westerville made to the city council, has been approved. The company is the first to apply for a license to operate busses under the ordinance adopted by the city council in July. The ordinance provides for five cent cash fares or six tickets for a quarter.

### ALLEN MOTOR CO. REORGANIZED

Columbus, O., Oct. 23—The Allen Motor Co. has been reorganized and announces that it is proceeding with the manufacture of Allen cars and parts in the factory of the old company. The officers are as follows: President, L. E. May; vice-president, J. W. Sansberry; secretary, A. O. Dunk.

## Driving Contest for Women Is Successful in Chicago

### Fair Drivers Show Skill in Many Feats; Dealers Pleased with Interest Shown

CHICAGO, Oct. 23—The Master Lady Driver's Contest, held in conjunction with the Chicago Automobile Trade Assn.'s Enclosed Car Show, has convinced officials of the organization that this endeavor to interest women in automobiles was successful. Forty-five entrants, all driving different types of enclosed cars, made the distance of 35 miles over Chicago's crowded boulevards in record time and more than half of the ladies drove their cars without the slightest breach of traffic or courtesy rules.

That the contest stimulated much interest, was evidenced in the fact that over the entire course, crowds of women greeted the drivers as they passed. Many motor fans gathered at the starting of the contest and when Miss Lois Daley, who was awarded the meet championship, the diamond medal and the \$100 in class one, drove her Elgin sedan back to the starting point, with only six discredits against her, many fair boosters of motoring let it be known that they were there.

Miss Elizabeth Edwards was awarded the \$100 prize in class three when she drove her Cole berline over the course with but nine points against her. The other prize of \$100 was won by Mrs. K. H. Benson who piloted her Dort coupe through the streets while stacking but 17 points against herself. Honorable mention was given to every entrant, because the skill displayed warranted it.

When the actual driving contest was finished, a "parking contest" was held in which the ladies showed their ability to get in and out of difficult places in a short time. The points made by the entrants in this contest were figured into the prize awards.

The dealers believe that this exhibition of driving skill will do much to encourage the women of Chicago to drive cars despite the complicated traffic conditions here.

### NEW AIR SPEED RECORD

MOUNT CLEMENS, Mich., Oct. 24—Flying a Curtiss Army biplane powered with a Curtis 400 hp. engine, Lieut. R. L. Maughan established a new world's airplane speed record by covering a one-kilometer course at the rate of 248.5 miles per hour.

### CADILLAC GROWS

DETROIT, Oct. 20—Statistics made public by the Cadillac Motor Car Co. show that in the last eight years Cadillac production of enclosed cars has increased from 7 per cent of the total to more than 54 per cent of the total production.



## IN THE RETAIL FIELD

James E. Duffell, formerly retail sales manager for the Hanson Motor Co., Atlanta, Ga., has established a new Studebaker agency at 259 Peachtree street. A new building is to be constructed for the company in West Atlanta.

Friday, the 13th, was a lucky day for Guy L. Smith, Omaha, Neb., Hudson-Essex dealer. He delivered 13 cars to dealers in 13 different towns of Iowa and Nebraska.

The Elliot-Brunt Motor Co., Springfield, Ill., has been appointed distributor for the Oakland car in the central Illinois territory.

Albert Johnson, El Paso, Ill., has purchased the garage of J. E. Kuntz at Roanoke, Ill., and will be given possession Nov. 1. He will operate the Roanoke plant as a branch of the El Paso business.

The Hipp Chevrolet Co. has been organized at Charlotte, N. C., to handle Chevrolet cars and trucks. The company has acquired a building at 500 North Tryon street, with more than 20,000 square feet of space. Complete stock of parts will be carried and service station maintained.

The Union Motor Co. has been organized at Monroe, N. C., by Philo Alcott and R. B. Redwine, Jr., to handle Studebaker and Dodge cars. The new company will be open about Nov. 1.

H. W. Alexander, with salesroom in Willimansett, has the distribution of the Star in Holyoke, Mass.

The Autrey-Gordon Motor Co., of Florence, Ala., will be the agents for the Star car in that portion of Alabama, according to an announcement recently made.

Among the dealers who have recently signed contracts to take on the Dort line are Ora P. Stewart, Jackson, Mich.; Daniel Mulconey, Hartford, Conn., and Boulevard East Garage, Guttenberg, N. J.

Clarence Hodson has opened a \$12,000 one-story brick fire-proof garage at 1512 Fourth avenue, Rock Island, Ill. Sales room is included and Hodson is completing contract for agency of a medium priced car.

Agency for the Mack commercial and fire trucks in the tri-city territory has been awarded the Joe R. Cook automobile agency, 320 Ripley street, Davenport, Ia. J. C. Koenek, Des Moines, Ia., representative for the Mack trucks, indicated that the agency will make Davenport distributing point eventually for its southeastern Iowa and part of western Illinois territory.

### PORTLAND DEALERS ELECT

PORTLAND, Ore., Oct. 23—A. S. Robinson-Smith Co., one of the nine authorized Ford dealers of the city of Portland, was elected president of the Automobile Dealers' Association of Portland at the annual session of the body held this week. C. L. Boss, head of the C. L. Boss Automobile Co., Hudson and Essex distributors, was elected vice-president. Robinson replaced A. H. Brown, who has served as president during the past year, while Boss succeeds A. C. Stevens.

### WISCONSIN PRODUCTION HIGH

MILWAUKEE, Wis., Oct. 21—Production of automotive parts and equipment is proceeding virtually at the peak rate of output reached during the summer, and there has as yet been no appreciable let-down in the volume of shipments, as delivery specifications are coming freely. As a rule, however, local parts shops have caught up on directions and are keeping about even. This is considered a very satisfactory situation.

### ADDING TO JANESVILLE PLANT

JANESVILLE, Wis., Oct. 20—Ground has been broken for two large buildings in Janesville, by the General Motors

An enclosed car show will be held in Louisville Nov. 20 to 25, under the auspices of the Louisville Automobile Dealers' Assn. A big advertising campaign will be launched two weeks before the exhibition. As usual, the enclosed car show in the fall will be staged in the showrooms of the various dealers.

Snyder Automobile Co., formerly situated at 148 S. High street, Columbus, O., has moved into a new fire-proof building just erected at 262 S. Third street.

The Kimberly Park Garage, Springfield, Mass., has been bought by T. F. Selzam and placed under the management of Warren McGrannis, for the past six years the service manager at the Cummer Garage in that city.

The State Street Garage, Springfield, Mass., has been taken over by Hampden Motors, Inc., as sales and service quarters for the Gray car.

Orr Motor Co., Springfield, Mass., has acquired the Bliss Street Garage as a Nash service station.

The Garth Motor Co., Birmingham, Ala., representatives for the Rickenbacker, have moved into their new location on automobile row, 209 South Twenty-first street.

Louie M. Gans has taken charge of the Nelson garage at Millard, Neb., and besides a first class repair shop, he has installed a small fleet of trucks for hauling live stock to the South Omaha market.

John Diestal has purchased the equipment of the Mangold garage at Elkhorn, Neb., and with the assistance of George Cacka, who is in charge of the repair room, will put in a full line of Ford parts.

Fred W. Tirrell and John J. Gilmore, formerly of the sales department of the Weldon Garage, Greenfield, Mass., have formed a partnership as Tirrell & Gilmore and have taken the Hudson and Essex agency in that territory.

The Porter-Minehan Co. has been organized in Atlanta with \$10,000 capital, and will handle at retail in the Atlanta territory the Hudson and Essex. The company is controlled by Samuel C. Porter, general manager of the J. W. Goldsmith, Jr.-Grant Co., and Ralph Minehan, of the same company. Sales rooms have been established at 520 Peachtree street.

A new building costing about \$20,000 is being constructed at Tuscaloosa, Ala., by the Tucker Motor Co., automotive dealers. It will provide 14,000 square feet of space and be used for show rooms and a service station.

Corp., to carry out its plan of using the greater part of the vast capacity of the Samson Tractor Co. works for the production of Chevrolet passenger cars, which embraces also the establishment of a new unit of the Fisher Body Corp. The Chevrolet addition will be 125x500 ft., extending the present Samson assembling floors. The Fisher body shop will be 160x600 ft. and have a capacity of 100 to 150 bodies daily. Both are to be finished by Jan. 1.

### GOODWIN ENTERS MOTOR FIELD

NEW YORK, Oct. 21—The Goodwin Car & Mfg. Co., producers of steel railroad dump cars, have established an automotive department and are manufacturing a 30 passenger coach chassis to list at \$5,000. Present plans call for the production of 100 chassis of which the first are now coming through their Poughkeepsie plant.

### REPUBLIC REOPENS TIRE PLANT

YOUNGSTOWN, O., Oct. 20—The Republic Rubber Co. has reopened its tire department at the company's Albert Street plant in Youngstown. Production will be gradually increased in the near future.

## Lee of St. Louis Addresses Decatur Dealers' Association

### Ruark of A. E. A. Sounds Keynote of Organization in Talk to Members

DECATUR, Ill., Oct. 21—That an automobile dealers' organization strengthens the industry and maintains an equality in business circles, eliminating to a great degree, the old time practice of "knocking" a competitor and trickery in dealing, was the keynote of an address before the Decatur Automotive Trade Assn. by Robert E. Lee, secretary of the St. Louis Automobile Dealers' Assn.

He was greeted by a fine audience of 145 dealers of this city and Macon county as well as some from counties adjacent. The meeting was in the nature of an educational conference to demonstrate points in efficiency and the vital importance of all dealers combining to maintain a first class organization. A banquet preceded the meeting.

B. W. Ruark, of the Automotive Equipment Assn., made one of the strongest points when he said: "The public wants material that is reliable and that is well known and will even pay extra when they recognize the extent of the service they are getting from such supplies. Put your money into material that will insure a prompt and profitable turnover."

"When an automobile dealer gets into financial straits these days, there is one of two things the matter. Either he has expended his money in unsalable stock that is lying dusty on his shelves or he is being 'gypped' by taking in used cars. Sell a man what he can legitimately use and you will profit in the long run."

"There is where the turnover comes on your service. Leaks in your business are highly detrimental. Your business will come to a standstill when the profits cease coming in. Leaks come in the form of lost time, lost tools, and non-spot cash payments for service so as to produce profits. Use time cards, arrange tools efficiently, and handle supplies conveniently and insist upon the prompt payment plan by customers."

"Do away with antiquated equipment and install modern, and thus save time and labor. We are in a period of intensive merchandising and if you dealers want shop profits, ask the people to buy. The success of your business will depend upon the efficiency of your organization."

Lee gave the concluding talk, emphasizing the need of dealers' organizations in order to protect the members and the buying public. As an organization, the dealers can go to the legislature and demand what is good for the industry and for the public and get it. "You can not do business by yourself," he continued, "and keep going successfully."

## CONCERNING MEN YOU KNOW

The directors of the Mercer Motors Corp., Trenton, N. J., are as follows: J. F. Brice, A. S. C. Fiske, W. M. Swain, E. D. Meyerowitz, C. A. Bona, W. G. Kimball, J. L. Kuser, J. L. Kuser, Jr.; E. C. Stokes, N. A. K. Bugbee, G. P. Smith, J. W. Richmond, R. N. Barnum, W. A. Smith and H. D. Fogg.

Guido Fornaco, president of the Fiat Co., of Turin, Italy, and M. Gobbato, works manager, are on the Aquitania, which arrives in New York the latter part of the week. This is their first visit to America and their plans call for a stay of about a month, in which time they will visit the leading automotive plants, accompanied by Harry T. Clinton, Fiat's American representative.

John Alderson, president of the Standard Automobile Co., Louisville distributor for the Cadillac, died this morning at his residence at Buechel following an illness of one week, of heart disease. An only son, Clifford Alderson, is manager of the Standard Automobile Co.

C. G. McDonough, formerly of the Templar Motors Co., in charge of eastern sales, and previous to that, with the Clydesdale Motor Truck Co. as district sales manager, is now with the Willys-Overland Co., in charge of the taxicab and commercial car sales.

E. L. Hoffman, late sales manager of the Milburn Co., of Toledo, O., has been appointed sales manager for the motor vehicle department of the R. Haas Motor Vehicle Co., of Springfield, Ill. He succeeds A. J. Brown, who joins the Kardell Motor Co. staff at St. Louis.

J. B. Bray, who for a number of years has been service manager of the Grant Motor Car Corp., has resigned and will join the sales force of the Cleveland branch of the Autocar Co.

W. H. Leach, of the Buick sales department, has resigned his factory position to accept the position of assistant sales manager of the Pence Automobile Co., Buick distributors for Minneapolis and the northwest.

Richard Horn has resigned as district sales representative at Portland for the Cleveland Tractor Co. to represent Bear Tractors, Inc., as district sales manager on the Pacific coast.

Volney S. Beardsley has been appointed western district sales manager of the United Motors Products Co., of Grand Rapids, Mich., who are actively in production now of their new one-ton speed model, the "Highway Special."

I. M. Lewis has resigned from the Bessemer Motor Truck Co., Grove City, Pa., effective Nov. 1. Lewis has been president and general manager of the company since its organization 14 years ago.

B. F. Pickens, formerly connected with the Amazon Rubber Co., has been appointed sales manager of the Tuscara Rubber Co., of Dover, O.

John D. Harrington, not Harrison, is the former assistant branch manager, Willys-Overland, Inc., at Atlanta, who has resigned to become connected with Barrett & Co., of New York City. A typographical error caused the misspelling of his name in the Sept. 28 issue of MOTOR AGE.

Alfred P. Sloan, Jr., vice-president in charge of operations of the General Motors Corp., has announced the appointment of William M. Sweet as general manager of the Klaxon Co., with headquarters at Bloomfield, N. J. Sweet, who has been a director and vice-president of the Klaxon Co. for several years, relinquished

his other duties with General Motors last October to devote his entire attention to Klaxon interests.

The Grant-Lees Co., Cleveland, which manufactures motor car and truck transmission, was strengthened greatly by the election last week of Henry A. Tremaine as president and director and Carl W. Blossum, director. Richard Ferguson was Tremaine's predecessor. Tremaine is vice-president of the Crouse-Tremaine-Kulas Co., treasurer of the Standard Equipment Co., and a director in several local companies, the Peerless Truck & Motor Co. being among them.

William T. Bush, for several years a sales executive of Studebaker and Packard factories, and, more recently, director of sales of the Gray-Dort factory, Canada, has resigned from the latter position and has returned to Detroit to reside. He has not announced his future plans.

George E. Adams who, early in the year, purchased an interest in the H. K. Smith Co., Ford distributor, Springfield, Mass., has acquired the interest of Smith and assumes full control of the business.

Harbert A. Clark, formerly of the Clark & Breck Co., Springfield, Mass., has joined the organization of R. M. Sauers, Marmon distributor.

Precision and Thread Grinder Manufacturing Co., Philadelphia, Pa., manufacturers of the multi-graduated precision grinder, thread lead variators and permanent alignment wheel truing heads, which was recently acquired by A. T. Doud, president of the company, announces the appointment of William H. Frick as chief engineer in charge of engineering, development and service departments. Frick was equipment engineer for the Budd Wheel Co. He was associated with Doud at both the Diehl Manufacturing Co. and the Hero Manufacturing Co. D. F. Bruce has been appointed superintendent in charge of manufacturing and production. Bruce has had extensive mechanical experience with such concerns as W. F. Sellers, Remington Arms Co.; J. E. Lonergan Co., and was formerly superintendent of the McCambridge Co.

F. E. Booth has been named sales manager of the motor bearings division of the Hyatt Roller Bearing Co., Detroit, following an extensive period of service with the company in the engineering and sales departments. Latterly he has been assistant sales manager.

Fillmore A. Drake, known in rubber circles for many years, died at his home in East Orange, N. J. After being associated for some time with the Goodrich Rubber Co. and G. & J. Tire Co., he became president of the Berrodin Rubber Co., of Philadelphia. More recently he was sales manager of the Howe Rubber Co.

C. G. McDonough, formerly of the Templar Motors Co., in charge of eastern sales, and, previous to that, with the Clydesdale Motor Truck Co., as district sales manager, is now with the Willys-Overland Co., in charge of the taxicab and commercial car sales.

Packard service managers held a quarterly conference at the factory in Detroit this week. Those attending were C. G. Culver and J. Minzenberger, of Philadelphia; J. W. Floriday, Baltimore; B. R. Teckham, H. W. Ward, N. C. Rogers, J. E. Mills, Knox Brown, A. Mattison, F. E. Bishop and R. E. Rosen.

were on display during the show. There were 30 makes of cars on exhibition and the various designs offered by the various dealers handling these cars made the total number of automobiles—different styles, on the floor, around 150. The show this year was held in the \$150,000 automobile building erected and designed for that purpose.

### BIG JORDAN INCREASE

CLEVELAND, Oct. 19—The Jordan Motor Car Co.'s production figures for the first nine months of 1922 show an increase of considerably more than 100 per cent against the first nine months of 1921.

## Increased Production Made Possible Ford \$50 Reduction

### Acquisition of Supply Sources Also Given as Reason for Oct. 17 Cut

DETROIT, Oct. 24—The \$50 cut on models of the Ford Motor Co.'s line, made effective on Oct. 17, was made possible by increased production and the acquisition and operation by the company of many of its supply sources, according to a statement by Edsel B. Ford, president. The new prices represent a cut of almost 100 per cent from prices prevailing in March, 1920.

"Revision in prices," Ford said, "is the result of the increased volume of business which our company has enjoyed during the present year, and also to the fact that we now own and operate many of our own sources of raw material, which enables us to continue increasing the quality of our product and at the same time keep the price so low that Ford cars are within the reach of everyone."

"Our production for 1922 is already in excess of a million, which has been an important factor in bringing down costs. Our present daily output is averaging better than 5,000 cars and trucks, which means a complete Ford every five and a half seconds of each working day. It is in anticipation of this continued demand that price adjustments are being made in order to keep in effect the policy of selling Ford products at the lowest price consistent with quality."

### Sixth Reduction Since March, 1920

"As our business has increased, we have constantly increased our equipment and manufacturing facilities, so that this price reduction merely reflects the progressive methods which come as a result of increased volume."

"This reduction, the sixth since March, 1920, brings the price of the Ford touring car from \$575 to the present low level of \$298. Corresponding reductions have been made on all other types."

The Ford reduction has been expected in manufacturing circles for some time. Both Chevrolet and Overland, in the low priced group, have recently made reductions and the Ford reduction completes revisions in the former low priced group. The recent Ford financial statement and declaration of price policy by Henry Ford indicated reductions would be forthcoming.

### HUPP MAKES NEW PHAETON

DETROIT, Oct. 20—Hupp Motor Car Co. is now in production of a special touring model, which will embody sport line features and sell at \$1250 f.o.b. Detroit. A roadster of similar type will be started in production in the near future. The car has nickeled radiator, rails, lights, etc., aluminum steps, disk wheels and a genuine Burbank top. There is no change in chassis construction.

### DALLAS SHOW BIG SUCCESS

DALLAS, Tex., Oct. 19—Considered from a view of displaying the latest things in motor vehicles, the annual fall automobile show of the Dallas automobile dealers held for ten days, during the State Fair of Texas, was the most complete exhibition ever staged in the southwest. Taken from the angle of actual business done during the show and the stimulus given the automotive business in this section of the country, the show was by far the most successful the Dallas dealers ever put on.

All kinds of passenger automobiles from the smallest and lowest priced to the largest and most costly vehicles,



## BUSINESS NOTES

Plants of the Stewart-Warner Speedometer Corp., Chicago, are reported working at capacity with no accumulation of finished products. Orders which have been taken for two months in advance indicate that business will continue to be large. Railroad car shortage has not been felt because practically all requirements were anticipated and material bought before the situation became severe and prices advanced.

According to F. J. Sizemore, secretary of the Chamber of Commerce, of High Point, N. C., a plant for the manufacture of automobile accessories will probably be established in that city within the next few months. J. Max Chamber heads the project.

Philadelphia Battery Corp. and the Vesta Battery Corp. have just become members of the Automotive Electrical Assn., the principal offices of which are at 5363 Hamilton avenue, N. E., Cleveland.

Houghton Mfg. Co., 115 S. Clinton street, Chicago, is the name of a recently incorporated pump and accessory manufacturing company.

S. B. Lane Motor Truck Line Co. was incorporated in Farmington, Ill., last week to operate a motor transportation line.

At a board of directors' meeting the McKone Tire & Rubber Co. held at Cleveland on Sept. 25th a semi-annual cash dividend of three per cent covering operations of the past six months was ordered paid to the common stockholders of record Oct. 1.

General Piston Ring Co., is the new name of the Teetor Mfg. Co. of Indianapolis, Ind. The change is brought about because of the fact that another company was making a ring known as the "Teetor" while this company's product has been known for some time as the "General."

Thompson Spring Co. has been formed, with a plant at Wilmington, Del., to manufacture and exploit nationally the Thompson shock absorber. This is a device invented by C. W. Thompson, of Wilmington, president and general manager of the company, and is especially adapted to the Ford car. It comprises a lubricated enclosed spring.

The Iowa branch of the Miller Rubber Co., of Akron, O., is to be moved from Cedar Rapids to Des Moines. Quarters have been leased by the company at 512 South West Ninth street.

Ground has just been broken for the erection by the Chevrolet Motor Co. of an automobile manufacturing plant in Buffalo that is to duplicate the one the same company is erecting in Cincinnati. The plant here will prove a noteworthy addition to the automotive industries of this section. On this land there will be erected besides the automobile plant a building in which Fisher bodies will be made. These bodies will be placed on chassis manufactured in the other plant. Both the automobile and the body company are controlled by General Motors.

Turner Machine & Mfg. Co., Kansas City, Mo., has increased its capital stock from \$100,000 to \$200,000. The plant's capacity is being doubled, also.

Automobile Lock Co., 2216 Michigan avenue, Chicago, has been incorporated to manufacture and deal in automobile locks and accessories.

Greer Mfg. Co., 2600 Prairie avenue, Chicago, is the name of a new manufacturing company which will deal in and make automobile bodies and parts.

Commercial Auto Body Co., Chicago, has changed its name to Wever Body Co. and has increased its capital stock from \$40,000 to \$200,000.

The G. & T. Tire Co., Indianapolis, is adding a night force of 250 men and increasing its regular force 30 per cent, according to a statement given out by W. B. Harding, president of the company. The normal employment rolls carry about 1700 men, and the production of tubes by the local unit of the U. S. Company is between 30,000 and 35,000 daily. The plant is said to consume about 1,500,000 pounds of rubber a month, and the production schedule for October and November surpasses any records previously made by the company.

Reed-Steinbaugh Motor Co. has been incorporated at Council Bluffs, Iowa, to handle the Durant car from that city.

The Mason Tire & Rubber Co., of New York, has selected Des Moines as a division point for the operation of branches of the Mason company. C. J. Marx, a former Mason branch manager at Atlanta, has been transferred to Des Moines and is now manager of the branch. Joe M. Dine is manager of the division.

A unit has been added to the plant of the Doss Tire & Rubber Co., of Atlanta, Ga., and

is now in production on Doss tires and tubes, increasing the former capacity of the plant by approximately 50 per cent, according to C. C. Harper, president.

Thorpe & Knight is the name of a new company organized in Atlanta, Ga., as state distributors for the Gray Motor Corp. Sales rooms are at 239 Peachtree street. Under the same name the company operated for the past ten years at Miami, Fla., as automotive distributors in Florida, this business having been disposed of.

The consolidated balance sheet of the B. F. Goodrich Co. as of June 30 last shows cash in banks and on hand of \$5,394,581; trade accounts receivable, \$17,337,015; other accounts receivable and sundry advances, \$2,913,000; raw materials and supplies, \$24,145,625. Account payable, \$2,161,683; sundry accrued liabilities, \$1,271,981; earned surplus, \$10,203,816, and total assets and liabilities of \$87,030,532.

The Master Tire & Equipment Co., Moline, Ill., which produces machinery for small tire plants, has been compelled to put on a night shift to enable it to keep up with orders. The plant is located at 1919 Second avenue. An order for \$25,000 worth of machinery has been received from a company just organized at Monticello, Iowa, and other large orders have been received from Kewanee, Ill.

Holley Carburetor Co., Detroit, will complete this month an addition to its factory here which will about double its floor space. Production in 1922 will double the output of 1919 when the present factory building was erected and will be the high production record for the company for any one year.

The Dall Parts Co. will start production in its new factory at Cleveland on Nov. 15, according to an announcement made by W. D. Smith, secretary of the company. The corporation was organized in 1916 and it has been situated in a plant in Vermillion, O. The business has grown to such an extent that larger quarters are needed to keep up with the demand.

Gray's Auto Parts Co., 3214 Brighton road, N. S., Pittsburgh, Pa., has purchased the entire stock of parts previously carried by the J. L. Keyser Auto Wrecking Co.

The Universal Electric Co. is a new firm that has just opened business at 1316 N street, Lincoln, Neb., by the Gerstenberger brothers.

The Crystal Auto Accessories Co. has been organized at Maywood, Ill. Capital stock has been fixed at \$40,000. The promoters include R. F. Hirman and C. I. Hoag. A lease has been taken on the building at 401 South 17th street.

W. G. Heine, Elgin, Ill., has let the contract for a garage building to cost \$30,000, to be erected this fall at the corner of Grove and Prairie streets. It will be one of the finest plants in that city and will be ready for occupancy about Jan. 1.

The Tom Joyce Motor Co. has been organized at Batavia, Ill., with capital stock of \$10,000. A garage will be opened at 403 West Wilson avenue and a sales agency and accessory store will be conducted. The promoters include Tom Joyce, D. R. Joyce and W. B. Joyce.

The Springfield, Ill., Automobile Dealers Assn. staged a membership drive during the month of October. After Nov. 1 no members will be admitted until after the spring display of cars.

The Trexler Co. of America, manufacturers of automobile accessories, with offices in Philadelphia, has taken over the local plant of the Artillery Fuse & Standard Arms Co. for manufacturing purposes. The local plant, which covers 27 acres, is located in South Wilmington, Del.

Originally established in Wilmington, Del., DuPont Motors, Inc., now located at Moore, Pa., near Philadelphia, is to be moved back to Wilmington. E. Paul DePont, of this city, is president and chief owner of the company, which manufactures the DePont car. The company expects to occupy a group of buildings in the double block bounded by Market, Lamont and Twenty-second streets and Vandever avenue, formerly occupied by E. I. DuPont de Nemours & Co., for the company's advertising division.

Capitalization of the Storage Battery Service Co., Inc., 423-25 West Second street, Davenport, Iowa, has been increased to \$25,000, divided into 200 shares of common stock and 50 shares of preferred at \$100.

Members to the central organization and affiliate with the Illinois Automotive Trade Assn. Lynn M. Shaw, representative of the National Automobile Dealers' Assn., spoke at this week's meeting, at which the drive was decided upon.

## Conditions in South Point to Good Sales of Automobiles

### Medium Priced Cars Will Benefit Especially; Alabama Crops Lead

BIRMINGHAM, Ala., Oct. 21—Conditions in the South and particularly in Alabama point to a good sales season for all medium priced cars during the fall months. Another indication of good fall business is contained in the increasing popularity of the enclosed car in the South. Many agents report that their sales of this type car have increased 100 per cent in the past year.

In Alabama figures made public during the past few days indicate that 10 of the farmers' crops will produce revenue to the farmers in excess of \$52,000,000 more than the same crops produced last year. This is considered the prime reason why the farmers are taking up their old notes, some of which are three years past due, and looking around for ways and means of investing their surplus funds.

The entire back indebtedness will, of course, not be absorbed this year, but it is thought that a great many farmers who have been "stamped" for several years past will come out of the hole and will have considerable excess funds. All of these men will be good prospective customers for automobiles during the fall, as in Alabama the only closed season is when the roads get too muddy and that happens in the summer months as often as during the winter.

Benefits of state organizations were emphasized by him. "Legislation can not be trusted," he warned, "and once a tax goes through, it sticks. A source of revenue is seldom repealed."

Blackhawk Motor Stage Coach Co., Rockford, Ill., with Ronald Fay, president and general manager, will succeed Fay Motor Bus Co., it was announced today, and a one-bus service instituted between this city and Oregon.

Quincy (Ill.) Automobile Trades Assn. plans intensive membership drive through Adams, Pike and Hancock counties to add 150 new members.

Closed car business will keep Velie Motors Corp., Moline, Ill., in operation throughout the fall and winter, according to predictions this week by company officials. A force of approximately 600 men is employed and will probably be maintained.

Bremer-Tully Mfg. Co., 532 S. Canal street, Chicago, is the name of a new incorporation to manufacture and deal in radio and automotive supplies.

The Mason Tire & Rubber Co., Kent, O., has announced a 5 per cent increase in prices on all its tires.

Inland Rubber Co. held its annual stockholders' meeting in Chicago recently and elected E. B. McKay as president, M. J. Flynn, treasurer, and F. L. Ayer, secretary.

The Burdick-Atkinson Corp., Hamburg, N. Y., has been established for the purpose of manufacturing steel wire springs for use in automobile coach work upholstery. John S. Burdick, formerly vice-president and general manager of the Buffalo Body Corp., is the incorporator of the new company.

The Timken Roller Bearing Service & Sales Co., Canton, O., has been chartered with a capital of \$25,000, to sell roller bearings and other accessories, and also to give service. Incorporators are H. H. Timken, Herman Ely, J. G. Obermeyer, J. F. Strought and Austin Lynch.

The Autocar Co., of Ardmore, Pa., manufacturer of the Autocar truck, on Oct. 21 will complete its twenty-fifth year.

# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### Heavy and Medium Duty Engines and Why

Q—Does the ordinary motor boat engine withstand the punishment that an ordinary automobile engine has to withstand? In what percentage?

1—About as close an analogy as can be drawn would be to compare the ordinary motor boat engine with the draft horse and to class the automobile engine with the saddle or road horse. The motor boat engine is analagous to the draft horse in that it is designed and built for a certain service which in his case, is known as slow speed or medium speed heavy duty work, whereas the automobile engine is ordinarily built for a wide range of speed and revolves at considerably high revolution and might be classed as a high speed light or medium duty engine.

The average motor boat engine would be as much out of place in an automobile chassis as the automobile engine would be in the hull of a fishing boat requiring constant service. Motor boat engines are heavily built with large bearing surfaces and no attempt is made to secure a low weight-power ratio. They are, therefore, generally speaking, better able to maintain full power at wide open throttle over a longer period of time than the average automobile engine. At the same time if the ordinary motor boat engine was subjected to rapid and constant acceleration and deceleration, as the automobile engine is, it would doubtless prove inefficient and would require overhauling much sooner than if used for the service for which it was intended.

There are many cases where automobile engines have been installed in motor boats, but only for racing service. It is impossible to arrive at any percentage of the comparative punishment that each duty imposes.

2—Which will last the longer, and what is the average revolutions of each?

2—Generally speaking the engine having the lowest crankshaft speed will with the same degree of workmanship last longer than a high speed engine. Granting that equal workmanship is put on each engine it is only reasonable to believe that the engine with the highest weight to h.p. ratio will run the greatest number of hours with the least attention, assuming, of course, that the details in design are equally good in the two engines. The average revolutions of the marine engine would be in the neighborhood of 600 to 700 r.p.m., whereas the revolutions of the automobile engine would be from 1500 to 2500 r.p.m.

3—Taking two engines, one in a motor boat and one in an automobile, which will give the greater service and how much?

### The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

3—We believe that the answers to the first two questions will suffice as a solution to this question. Where an engine is subjected to varying loads it should be especially designed for such which, incidentally, requires a compromise between a high weight ratio and a low weight ratio, whereas constant load engine can be made of heavier parts and bearings with greater area, but will have the disadvantage in that they will have great inertia losses, whereas the lighter engine will be superior in that respect.

Given two engines of equal workmanship and design, with the material of high quality, it is doubtful whether there will be any great difference in the amount of service delivered by each if it were based on the number of revolutions of the crankshaft per minute. In all probability the high speed automobile engine would require overhauling in a shorter length of time than would the motor boat engine, but in that same period of time it would have revolved approximately twice as many times as the motor boat engine. Based on the revolutions per minute or revolutions per year basis it is doubtful whether there would be any great difference in the amount of service rendered.

### Valve Timing on Harley Davidson Engine

Q—Publish details of the timing on a 1916-1917 Harley-Davidson twin-cylinder motorcycle. Also give correct setting of contact points and explain how to adjust the carburetor on this machine.—A Reader, Greenleaf, Kan.

The timing can be checked by removing the inspection plate at the side of the engine, which can be taken off after 18 screws have been removed. All of the gears are marked with a chisel and as the engine is turned these marks should come together. If there is any question as to the correctness of the marks and it is desired to check up the valve timing without referring to the marks, it is usually considered necessary to remove the engine from the frame. The plug in the center of the cylinder can then be removed and a scale inserted through this plug to determine the true position.

The piston should come up on the compression stroke with both valves closed and should then go down on the stroke that would be the firing stroke. The correct time for the exhaust valves to open is  $\frac{5}{8}$  in. before bottom dead center and the exhaust valves should close from  $\frac{1}{32}$  to  $\frac{3}{32}$  past top dead center. If the exhaust valve is properly timed it will be unnecessary to check the intake valves. It is possible to check the piston position without removing the engine from the frame, but can only be accomplished by a mechanic experienced in work of this kind, as it is necessary to take out the inlet cage and make up a specially shaped bent wire which is inserted in order to fill the piston position. The opening of the ignition interrupter points should be .022 with a magneto or .028 with a battery ignition and generator.

The ignition should be timed so that, in the advanced position of magneto, the interrupter points start to open when the piston is  $\frac{5}{16}$  in. below top dead center and still coming up, in other words,  $\frac{5}{16}$  early. In the retard position this should give the opening of the interrupter points when the piston is on top dead center. With the battery or generator ignition system the points should open in the advanced position from  $\frac{7}{32}$  to  $\frac{9}{32}$  early on the piston. If the ignition seems to be properly timed and the engine backfires with a Dixie magneto, it is due to the two high tension wires being reversed.

In regard to the carburetor, would say that the air valve spring should first be checked to see that a 7-ounce pull is required to barely move the valve from the seat. With the air valve spring properly set, the needle operated by the cam

(Continued on next page)



**Architectural Service**

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things,

we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

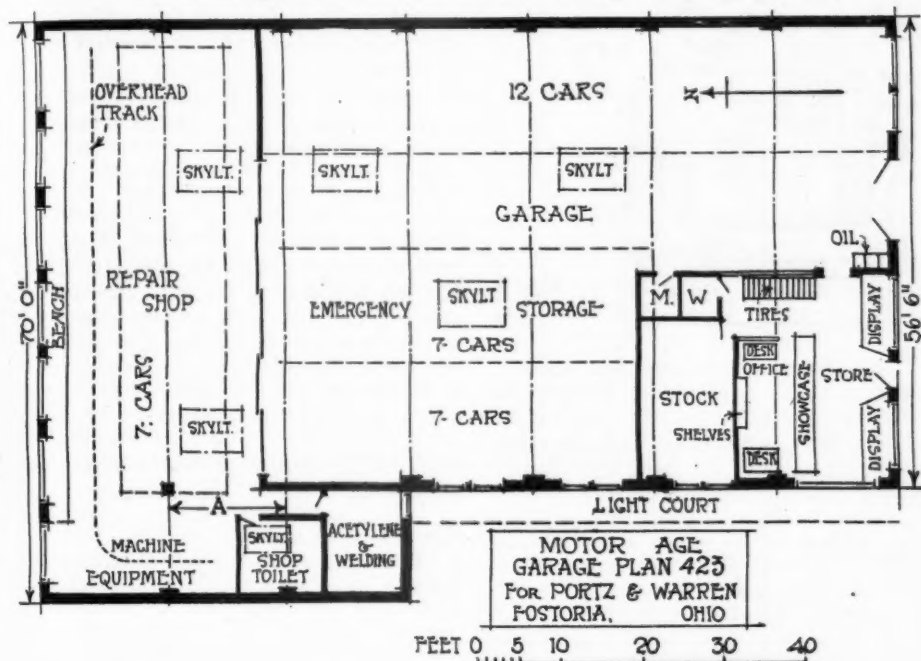
What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

**Advantage of a Narrow Alley Not Great**

Being a reader of Motor Age, I take this opportunity of addressing you relative to garage plans. I have just bought a building site as per enclosed sketch and will greatly appreciate same if you will furnish plan of best arrangement for a garage best suitable for this lot. I wish to build one story of blocks or hollow tile. I wish to do storage, repairing, oxy-welding and I have an acetylene generator which I understand must be in a room separate from the repairing and storage room. I also have machine tool equipment. I also wish to handle accessories and tires.—Portz & Warner, Fostoria, O.

There is not a great deal to be said of this layout. The north light in the back would be ideal for the shop and for that reason, if no other, it should be located there.

The alley is rather narrow and would not make a very good exit from the garage especially if there happened to be a truck standing in it delivering goods to the factory next door. We believe it

is entirely unnecessary to provide more than one entrance; your storage customers, as they leave their places, will all go out the front way and the only customers who will really want to go out the back way will be those who drive in for quick service or to ask a question. They, of course, would rather drive through than bother to turn around.

The roof should be trussed and we have indicated six 60 ft. trusses, the two rear ones being supported at their west ends on posts from which beams extend the remaining 13 ft. to the wall of the extension. This is for the purpose of making the roof and trusses uniform.

The width of the garage section is hardly enough for 3 rows of cars, the aisle would be too narrow, though in emergencies a third row might be placed at the expense of convenience.

(Continued from preceding page)

can be turned down until it seats and then backed off  $2\frac{1}{2}$  turns, which will be near enough to start and run the engine. The high speed adjustment, which can be set at either 1, 2 or 3, should be left at the middle position, which is No. 2, and the engine should be run until thoroughly warm.

When the engine has been warmed up, the motorcycle should be run and the needle valve adjusted one way or the other until the throttle can be suddenly opened without causing trouble due to

carburetor action. This means that the engine should pull strongly and not miss due to wrong adjustment and if the engine suddenly stops when the throttle is opened, a leaner or richer mixture should be tried. At high speeds a different adjustment of the high speed lever should be tried, this being either to the No. 1 or 3 position, and the auxiliary air valve can be opened. Care should be taken, however, to see that this auxiliary air valve is closed when making low speed adjustments.

**MOTORCYCLE ENGINE DOES NOT IDLE BECAUSE OF AIR LEAKS**

Q—We have just overhauled a 1919, model 61, Harley Davidson twin motorcycle. This engine runs fine when on a pull or running around 12 m.p.h. or more, but when you idle the engine down it will only hit on the back cylinder. Engine has good compression on both cylinders. We have tried three other carburetors which were working fine on the engines from which they were removed. The different carburetors seemed to help some but the engine did not run right even then.

When the engine was overhauled the generator was overhauled, also battery was fully charged, new brushes put in, new points on battery and generator cut-out, new spark coil and new distributor cap and high tension wires to plugs and coil, also new spark plugs. During the time the front cylinder is missing, there is a good spark at the plug, timing is O. K. and have had other motorcycle mechanics from Harley-Davidson shops check up on same. Cannot find any leaks in inlet manifold or connections.—P. A. Base, Woodland Garage, South Bend, Ind.

It is apparent from your letter that your engine has been pretty well checked as to valve timing and ignition. We would therefore suggest that you now concentrate your activities on the examination of the engine for air leaks at the intake valve, guides and intake valve cage or housing.

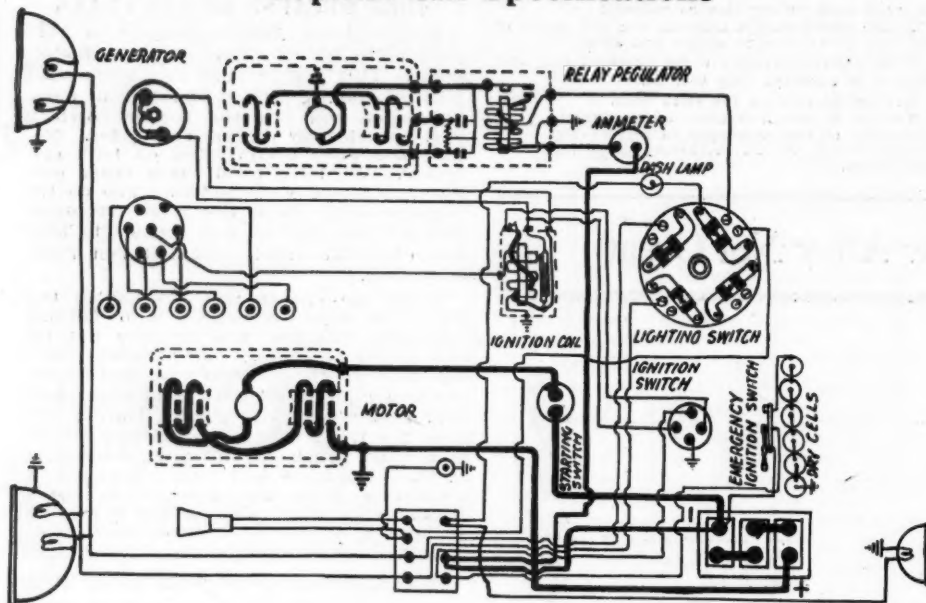
Remove the intake valve cage retaining nut which will allow removal of the intake cage or housing proper. It will be noted that the bottom of the intake valve cage makes contact with the bottom of the cylinder, that is, a seat is provided in the cylinder casting for the bottom of the intake valve cage, and as this seat may require grinding it is advisable that you first remove all dirt with a clean rag and give the intake valve housing a coat of Prussian Blue only at the point where it makes contact with the bottom of the cylinder casting or seat.

If the test with Prussian Blue shows that the valve cage or housing does not make contact at all points on the seat it is conclusive proof of an air leak. The cage should then be ground into the seat, great care being taken at the same time to prevent any valve grinding compound getting on any portion of the cage or cylinder above the valve seat.

After grinding with fine valve grinding compound the seat should be given a few minutes' grinding with very fine grinding compound mixed with oil which will have a very pronounced lapping effect and will provide the necessary air tight joint. The cage and cylinder must then be very carefully wiped out to prevent any compound getting between the walls of the cage and cylinder castings.

It is to be remembered that the cage is not to be ground on its diameter but only at the bottom, where it seats in the cylinder casting. After this is done, check up on the inlet and exhaust valve guides. If the guide in the inlet valve cage is worn so that it has a diametrical clearance of more than .008 it should be either rebushed or replaced with a new cage or new valve stems, depending on which will compensate for the wear.

## Orphan Car Specifications



Q—Desire information pertaining to a 1914 Model Norwalk car. It is 6-cylinder underslung frame, 7-passenger touring car, tires 40x4½, right hand drive; center control levers. What is the bore and stroke?

1—Norwalk cars using 40x4½ in. tires were manufactured in 1913, there were two models with two different chassis, both of 6 cylinders, one 4 by 5 and the other 4½x5½. As you have not informed us of any serial number or engine num-

ber we are unable to tell you whether this is a model A or model B Norwalk. With the exception of the change in cylinder bore, both models have the same specifications, as to bearings, tires, transmission, ignition and carburetion.

2—What is the horsepower?

2—The h.p. of the model A, 4x5 would be 38.40; h.p. of the model B would be 48.60—S. A. E. h.p.

3—How many miles per gallon?

3—This is not known but we would be inclined to believe that about 10 to 11 miles per gallon maximum could be secured from such an engine.

4—What is the wheelbase?

4—The wheelbase of the model A with a small engine is 136 inches; the model B with a large engine 144 inches. By measuring the distance from the center of the front hub cap on one side to the center of the rear hub cap on the same side you will be enabled to find the wheelbase in inches and this will determine whether the car is a model A or a model B.

5—What speed would it make per hour?

5—The touring model would make between 60 and 68 m.p.h.

6—Would it be possible to send me a wiring timing chart of this car?

6—A wiring chart of the 1913 model 9 Norwalk which has the Gray & Davis electric system with the Atwater-Kent ignition is shown at the left. The timing chart of this engine is not available and we would suggest that you time the engine from the marks on the flywheel, or if the marks are not visible set the exhaust valve so it closes about 10 degs. after upper dead center and have the inlet valve open approximately at the same time.

7—What type of axle has it?—C. White, Calgary, Alta., Canada.

7—The car carried a ball bearing full-floating axle with a gear ratio of 3.72 to 1.

## HOOSIER CLUTCH ON OLDSMOBILE

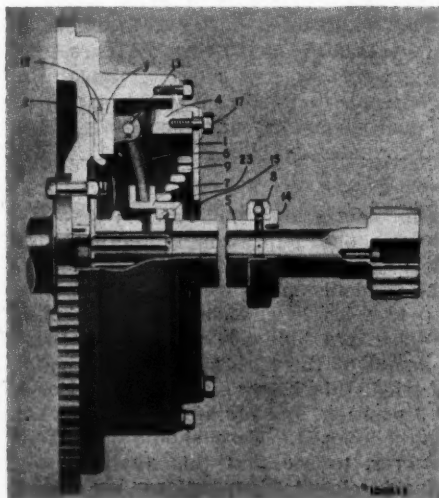
Q—We have an Oldsmobile model 43A, 1921, which has a Hoosier single plate clutch. It is impossible to shift gears without them spinning and clashing unless the motor is running at very low speed. We have loosened the clutch as much as possible and the clutch pedal is adjusted to the proper position, but still cannot get satisfactory results.—E. C. Ehrecke, Montpelier, Iowa.

A sectional view of the clutch is shown below. A detail which is not shown however is a 3-in. diameter fiber washer 1 in. thick which is now used as a clutch brake in back of the part which is marked 14. A few of the model 43A Oldsmobile cars did not have this fiber and, if such is the case here, would suggest your getting one of these from an Oldsmobile service station. Another possible cause of the clutch dragging is lubricant from the transmission working into the clutch housing.

If this is suspected it is possible to inject kerosene into the clutch housing through an opening remaining by removing one of the cap screws, 17. The clutch can then be operated this way and finally the kerosene can be removed again by putting this opening at the bottom so that the oil can run out. It is possible, however, that the clutch is not properly adjusted and we will accordingly explain the adjustment. Access to the clutch is gained by removing the toeboard, and then by opening the triangular plate in the top of the flywheel housing.

Constant throwing in and out of the

clutch causes wear on the friction disc 12, eventually causing clutch to slip. To compensate for this wear, loosen adjusting screws 17, of which there are two, then rotate to right full length of the cover slot. Ordinarily one complete throw of the cover slot suffices, but if slipping still occurs, remove adjusting screws and insert in tapped holes appearing in ring at left end of cover slot, repeat operation until slippage ceases; then if clutch drags, causing spinning and clashing of gears when shifting, set adjusting ring back to left until dragging is eliminated. Be sure adjusting screws are tightened before starting motor.



From your description we believe that if the clutch is not full of gummy oil and if you have a clutch brake that the trouble is due to adjustment being turned too far to the right in which case it should be moved to the left until the clutch slips and then back to the right again just enough to make operation satisfactory.

## WHAT CAUSED IT?

Q—We have a Ford car, just been overhauled and is in good shape. This engine after three hours of moderate driving started to miss. It made a sound similar to a blown out gasket. The fourth spark plug was red hot. After changing plug it ran as good as ever. Tell me what could cause this trouble.—H. C. Adelman, Bloomington, Ill.

This occurrence provides food for thought and we invite the many trouble shooters of the Readers' Clearing House columns to advance their opinions as to the cause of this mysterious heating of the number four spark plug. We should like to find out from our subscriber whether the exhaust manifold was also red hot and also would like to know the type of spark plug, as we are of the opinion that this overheating of the spark plug was due to a very bad case of pre-ignition. If possible we would suggest that the spark plugs be sent to this office for examination and also further information as to the other conditions present at the time of the overheating.



## Peculiar Action of Ford Lights

Q—We have two Fords, 1916 model, that burn out light bulbs very rapidly. The wiring is all new and new sockets have been used. 12-16 volt bulbs will also burn out. Is there some kind of voltage regulator for the Ford magneto so that we can stop this condition?

1—On page 45 of the June 29 issue of MOTOR AGE we showed the wiring of the old type Ford that did not have a starter. With this wiring, current from the magneto comes to the lighting switch and goes to the switch to the right headlamp and then from the right headlamp to the left headlamp and then to ground. This means that the same current goes through both lamps, first through the right one and then through the left one. Inasmuch as you are having trouble due to lamp burning out, it occurs to us that possibly in putting in the new wiring you got the wrong kind of wiring and have the lamps wired in parallel instead of in series as 9-volt bulbs are supposed to be used which means that they are capable of standing 18 volts as they are wired in series.

We would, accordingly, suggest your checking the wiring as we believe this is where the trouble lies. The last year or two that Ford cars were put out without starting equipment there was also used in the wiring a little coil wound on an iron magnetic frame which was put in series with the circuit and had the effect of limiting the current to the lamp when the engine raced.

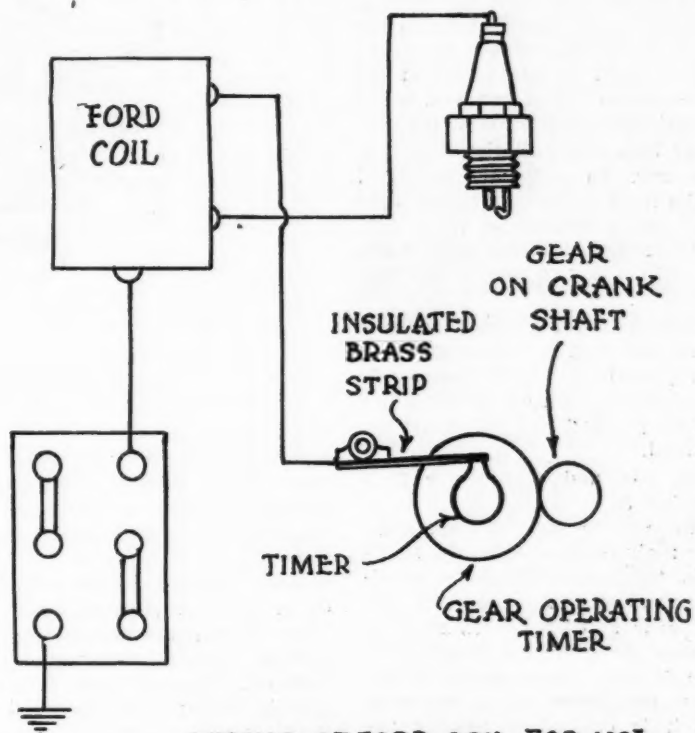
2—We have another Ford car, 1921 model, with funny lights. Both lights burn O. K. in the bright position but just as soon as the lights are turned to the dim position only one lamp lights and the other one goes out. If we now take the bulb that is out and turn it around and turn the lamps on bright, this bulb will light in the dim position and the other one in the bright position. We have tried all sorts of bulbs and have turned them in all ways but have been unable to overcome the trouble.

2—On the Ford car with the starting and lighting system there is a junction block at the left side of the dash under the hood. From this junction block we have wires running to each headlamp carrying current for the bright and dim

positions and it is obvious from your description of the trouble that the wire is broken or disconnected which is supposed to carry this current from the junction block to the dim bulb in the lamp which is giving you the trouble. We would, accordingly, suggest your removing the plug from the lamp that is giving trouble and taking a piece of wire or pair of pliers or any other metal

3—Show how to operate a stationary gas engine from a Ford coil and battery. —Louis Deig, Howell, Ind.

3—Diagram is shown herewith which illustrates method to be used. It will be necessary to have a timer turning half as fast as the crankshaft of the engine, assuming, of course, that you have a four-cycle engine. This means that the gear which is attached to the timer will have twice as many teeth as



WIRING OF FORD COIL FOR USE ON STATIONARY ENGINE\*1008126

object and quickly making a connection from the frame of the car to first one of the contacts and then to the other.

You should get a spark at each one. If you do not it shows the trouble is not in the lamp but in the plug or in the wiring back toward the junction block. The most common cause of trouble is a poor connection in the plug itself and we would suggest that you use a small screwdriver and remove the wires and inspect them and see that they are both securely fastened in the two terminals in the lamp plug.

the gear on the crankshaft so that the timer will turn half speed.

As indicated in the diagram, an insulated brass strip connects from the upper terminal of the Ford coil in such a way that rotation of the timer will ground this brass strip to the frame of the engine. It will be seen that one terminal of the battery connects to the bottom terminal of the Ford coil while the other battery terminal is grounded or connected to the frame of the engine. The lower terminal at the side of the Ford coil goes to the spark plug.

## POINTERS ON DORT CLUTCH

Q—Publish adjustments of the 1922 Dort touring car clutch.

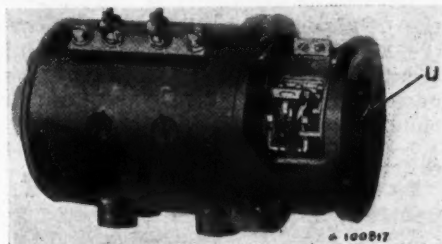
1—The Dort clutch has six discs but is not equipped with any adjustments for varying the pressure on these discs. The points that require attention are as follows: See that the anti-rattle springs are attached to the discs and also the small compensating springs on the release yoke are always in position. Lubricate the release bearings frequently which is done by pulling and releasing the handle on the oil cup found in the floor board.

See that the set screw on the right side of the bell housing is set so as to allow the clutch to go into full engagement and give about  $\frac{3}{4}$  to 1 in. play to the pedal when the clutch is engaged.

See that the clutch pedal has at least  $\frac{1}{4}$  in. clearance with the floorboard when back in the engaged position.

2—How is adjustment made for the charging rate on a 1915 four-cylinder Studebaker?

2—A view of the 1915 four-cylinder Studebaker Wagner generator is shown in Fig. —. Adjustment is accomplished



by moving the third brush which is controlled by the clamping screw shown at "U." This screw probably is sealed if the generator has not been tampered with since leaving the factory. The third brush regulation should be so set that the generator will deliver 10 amperes at 700 r.p.m. of the engine. It should have a maximum output of 18 amperes at 1100 r.p.m.

3—How much end play should the crankshaft in a D-45 Buick have and can this be taken up by replacing a new lower bearing cap in the back center main bearing?—D. C. Slick, Mgr., The East Granite City Garage, Granite City, Ill.

3—The crankshaft should not have more than .008 to .010 end play, while the recommended clearance is .004. The end play can be removed by installing a new lower cap on the center rear bearing.

## Removing Clutch on 1917 Model K Grant

**Q**—What is the proper way to proceed to remove the clutch on a 1917 model K Grant?

**1**—Before the clutch can be removed it is necessary to remove the rear axle, so that the gear box and clutch may be pulled out together. To remove the rear axle, it is simply necessary to hoist the rear end of the car free from the ground, disconnect the upper shackle bolts at the rear end of the spring, remove the brake rods at their point of attachment at the rear cross-member frame hangers, break the universal joint connection at the rear of the gear box, and pull the rear axle out to the rear. In taking the universal apart at the front end of the torque tube or rear of the transmission it is very essential to keep track of the shim which is in between the two parts that are bolted together.

When the job is put together again it is also quite essential of course that this shim be replaced exactly as found. If this is not done the bell on the propeller shaft will be pinched and universal action prevented.

The gear box and clutch are next stripped prior to their removal. It is advisable to tape the ends of the starter wires after their removal from the starting switch, thus preventing the possibility of a short circuit. If desired, the brake and gear shifting levers may be removed from the gear box housing although this is only done when it is desired to get the parts out of the way and when it is desired to inspect the gears. Next the three bolts holding the end ball bearings to the flywheel are removed, so that nothing except the side arm bolts to the engine base hold the gear box and clutch assembly in place. The two outside bolts on each of these arms should be removed first, and then, holding the assembly in place, the upper inside bolts should be removed and the entire assembly swung out of place.

**2**—This clutch drags on the bottom when released from flywheel. Do you think this is caused by worn clutch bearing? It also grabs when car is started.

**2**—The dragging action to which you

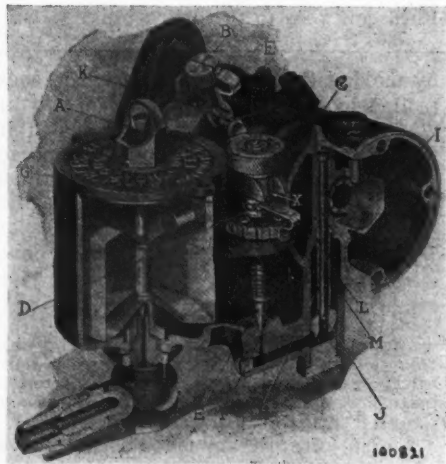
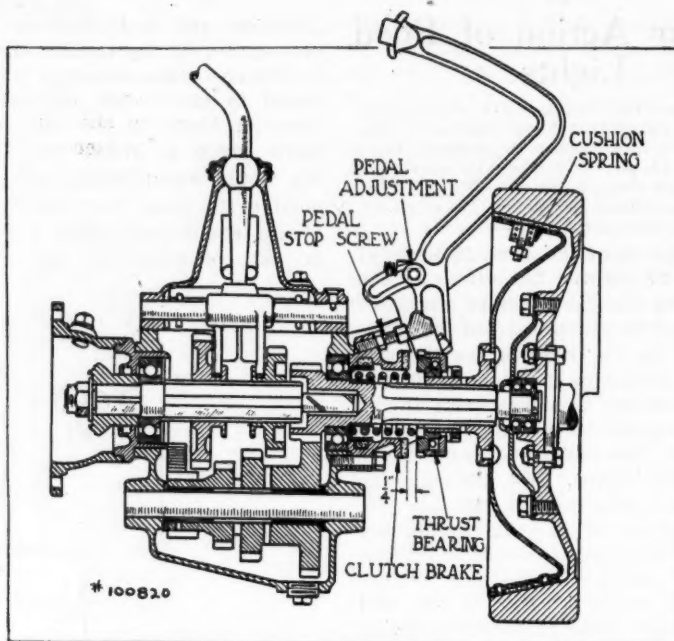


Fig. 1. Stromberg Carburetor on 1917 Model K Grant



This clutch and gearbox section shows the points of clutch adjustment, as well as the points requiring attention. Note the position of the thrust bearings.

refer may be, as you suggest, due to worn clutch bearing which can be determined if clutch is removed. Another cause for the clutch dragging is due to improper adjustment of the three clutch cushion springs which are located underneath the surface of the clutch lever. These springs are adjusted by small nuts held in place by cotter pins. When the clutch is engaged these nuts should be  $1/64$  in. away from the steel stamping. If this distance is greater the clutch will tend to drag while if the distance is less a grabbing action will be noticed.

Improper adjustment of the clutch brake will also cause the clutch to drag. When the clutch is engaged the distance between the rear end of the clutch hub and the clutch brake friction ring should be  $1/4$  in. If it is less than this amount the clutch will not be fully released when the brake comes into action; and if it is more it may not come into action at all, thus permitting the clutch to spin and the gears to clash. This space may be adjusted by loosening the lock nut on the clutch hub and screwing it as far forward as possible. After the lock washer has been pried loose the clutch brake flange may be screwed either forward or backward until it is  $1/4$  in. from the friction ring. It should then be locked in this position.

Frequently trouble will be experienced from wear in the ball thrust bearing in the throwout yoke. This is ordinarily caused by the drivers riding the clutch. It is possible to lubricate this bearing to a certain extent by applying oil to the outside while the engine is running, but the only positive method is to remove the clutch and pack the bearing with grease. Removal of the clutch is also necessary when relining or scraping the clutch leather.

**3**—What causes the rear axles to break so frequently in this car?

**3**—We do not know of any chronic trouble of this nature, but in view of the

questions asked in regard to the clutch we figure that possibly grabbing of the clutch in starting the car has contributed to this condition. The remedy, of course, is to repair the clutch so as to get smooth operation but whenever a car is used where the clutch grabs it is advisable to start up in second speed instead of first so that the engine does not get quite so much leverage on the axle.

**4**—Give adjustments of the Stromberg carburetor model LB 1 which is used on this car.

**4**—A sketch of this carburetor is shown in Fig. 1. There are three adjustments on this carburetor; A, the main adjustment, controls the gasoline supply from the float chamber, regulates the mixture through the whole driving range and should be set so that the motor shows its best life and power. Turning nut A clockwise or to the right raises the needle and gives more gas; anti-clockwise, less. If an entirely new adjustment is necessary, turn nut A anti-clockwise (to the left), thus lowering

(Continued on next page)

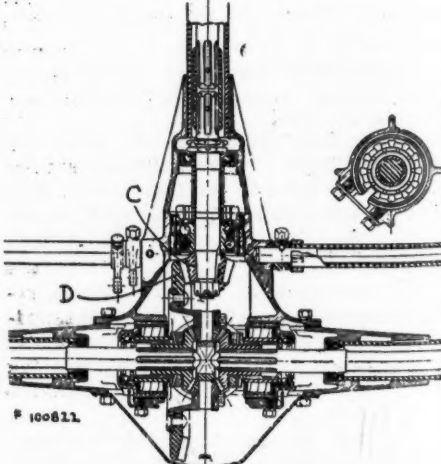
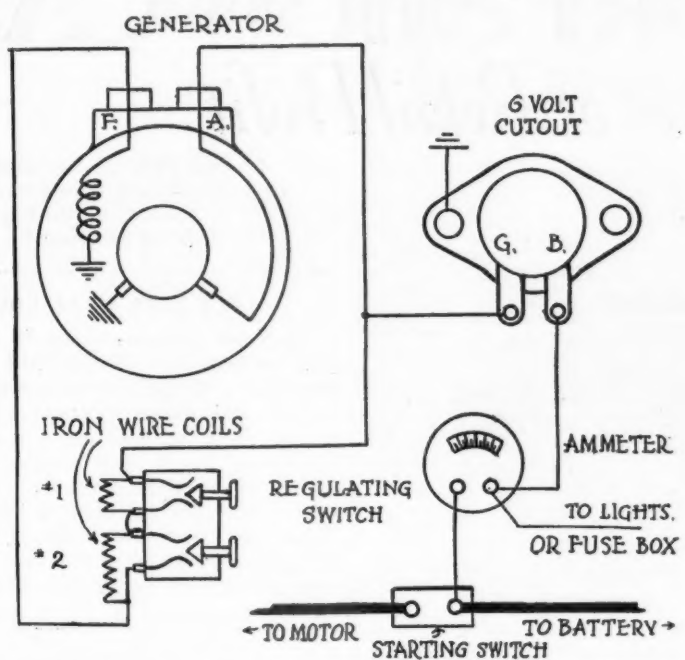


Fig. 2. Differential Adjustment on 1917 Model K Grant



## Home Made Regulator for Westinghouse Generator



WESTINGHOUSE \*400 AND \*450 GENERATOR WITH IMPROVISED REGULATOR. \*100779

Q—The information we received from Motor Age in regard to action of a regulator used with Westinghouse generator on Kissell car model 4-32 was quite helpful and, although the instructions were followed, the regulator does not work perfectly all the time. We are using an old battery and find it is hard to make it take a charge. We bypassed the Westinghouse regulator and now use a Ford cutout, which is doing very well, but not

as well as it should.—John Rose, Ironwood, Mich.

1—While it is possible to omit the use of a regulator with the No. 450 frame Westinghouse generator we believe that at times you may be charging the battery too much. We would, accordingly, suggest wiring up as per attached sketch, wherein two iron wire resistance coils

are used for regulation in connection with any two gang lighting switch. As shown in the diagram, it will be seen that current from the armature or A post of the generator will go through the regulating switch to the F or field post of the generator. If both of the push buttons are pushed in the resistance coils will be shorted out and generator will charge its maximum.

This will be satisfactory at low speeds and, as the car speed increases and the ammeter current shows 15 amperes or more, it will be well to pull out the No. 1 button on the regulating switch. If this is not enough the No. 1 button can be pushed in and No. 2 pulled and if this is not enough both No. 1 and No. 2 can be pulled out.

If, with both buttons out, the current to battery exceeds 15 amperes it would be well to redesign the resistances on the back of the switch, using a greater length of iron wire or else wire of smaller diameter. A device of this kind is better than no regulation at all, but is not equal to the standard regulation.

### DISC CLUTCH NOT READILY INSTALLED IN CAR USING CONE TYPE OF CLUTCH

Q—Tell me whether the new disc clutch, that is regular equipment in the New Studebaker Special and Big Sixes, is replaceable in the 20 and 21 Special and Big Sixes that have cone clutches and, if it is, the approximate cost of installing one in either model.—Harris Opp, Dillon, Mont.

The disc clutch as installed on the new series Studebaker cannot be applied to the 1920 or 1921 series Studebaker cars.

(Continued from preceding page)

needle until it just seats (as shown by its sticking slightly when raised on lifting A), then turn A 24 notches clockwise, which should give a mixture somewhat rich. After starting and warming up the motor, this adjustment may be regulated as necessary for the best driving mixture.

The idling adjustment is made as follows. The gasoline for idling is taken in above the throttle and controlled by dilution with air from inside of the carbureter, as regulated by screw B, which should be between  $\frac{1}{2}$  and  $1\frac{1}{2}$  turns to the left, or anti-clockwise, from the seating position. After the motor is warm this may be regulated as necessary, turning to the right or clockwise for more gas and to the left, or anti-clockwise, when less gas is required. Note that idle adjustment is effective only when throttle is nearly closed.

The economizer action is as follows. As the throttle is opened it will be noticed that at closed and wide open position the nut A and needle A are stationary, but at positions corresponding to speeds from 10 to 35 m.p.h., the needle drops so that C rests on D. This function is based on the fact that a richer mixture is required for full power and wide open throttle than for closed throt-

tle driving, when economy is the main consideration.

The amount of this economizer action, or drop of the needle, depends upon the clearance shown at X and is controlled by the position of the pointer L the extent of the action and consequent leanness of mixture increasing with the number of notches. To make this adjustment retard the spark, open the throttle to about a 20 m.p.h. position, and set the pointer one notch less than the thinnest mixture on which the motor will run steadily when warm. This will usually be the third or fourth notch.

5—We cannot get more than 35 m.p.h. from this car. Is this the best that can be accomplished with this model? The engine seems to fire regularly and the car is a good hill climber.

5—With this car in the best condition you should get 45 m.p.h. It is possible of course that the cylinders are not perfectly circular and that accordingly the explosion pressure or part of it leaks past the rings. Other possibilities are insufficient spark advance and improper carbureter adjustment.

6—Show adjustment of differential.—E. W. Everett, Elgin, Ill.

6—Adjustment of the differential will be explained in connection with the cut given in Fig. 2. To properly adjust the meshing of the differential ring gear with the pinion the inspection cover on the

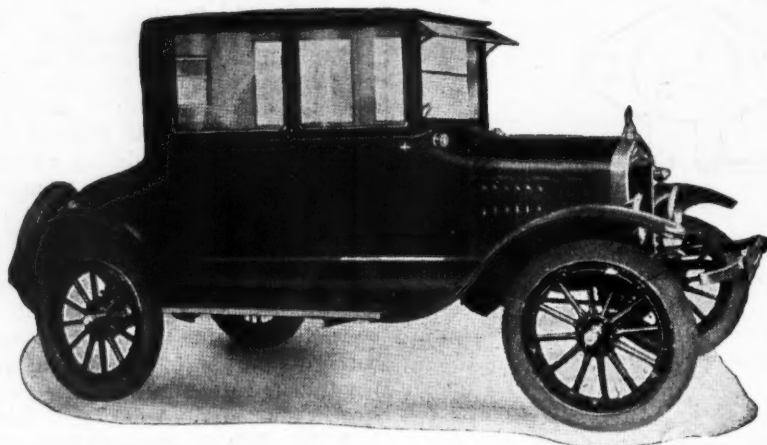
rear axle should be removed. The pinion and ring gear should come together exactly and should have a back lash not to exceed .008 and .010 inches. If the pinion extends beyond the teeth in the ring gear it will be necessary to back it up and make an adjustment of the ring gear by means of the adjustment at the left of this gear on the main axle housing.

When properly adjusted it should be possible to run a cigarette paper between the gears without utterly destroying it. The pinion is adjusted by removing the lock plate at the left side of the pinion housing immediately forward of the differential case. The lock nut can then be loosened and the adjusting cage can be turned to the right to set the pinion C nearer to the ring gear D or can be turned to the left to move the pinion out from the ring gear.

By reference to the cut of the differential you will see that it is supported on roller bearings and centered by means of ball thrust bearings. To move the ring gear more closely into mesh with the pinion it would accordingly be necessary to back off the ball thrust bearing at the right and tighten up on the one at the left until the proper position is attained after which the one at the right could again be brought back into position.

# The ACCESSORY SHOW CASE

## New Sources of Retail Profit



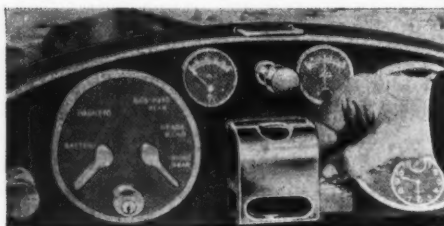
### LAWRENCE BODY FOR FORDS

The Lawrence four passenger Victoria coupe body for Fords is equipped with visor cowl, dash and dome lights, gasoline gage, window shade, mechanical

window lifts and is upholstered in any desired material. It seats four adults and adds to the appearance by its low lines. J. C. Lawrence Co., 3032 Locust Street, St. Louis, Mo.

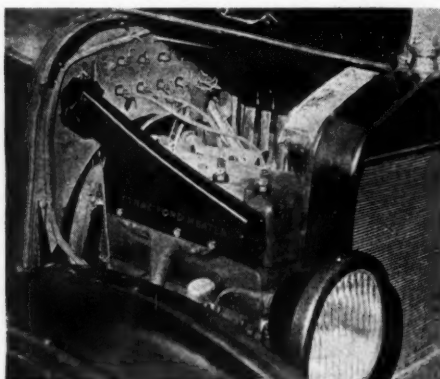
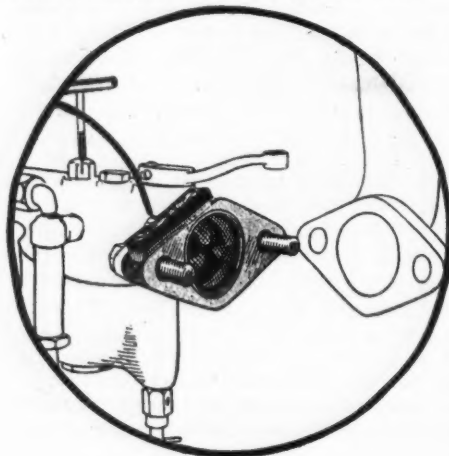
### RUBY MATCH-ASH HOLDER

The Ruby Match-Ash Holder is the product of the Ruby Mfg. Co., Springfield, O. It is heavily nicked and attaches to the instrument board as shown. A lower compartment is for matches while the upper serves as an ash receptacle. \$1.75.



### HOT PRONG VAPORIZER

The fine mesh of the vaporizer aids in breaking up the small particles of raw fuel, thereby adding to the ease of starting. The hot prongs pre-heat the gas which also aids in starting. \$5. Hot Prong Carbtorizer Co., Portland, Ind.

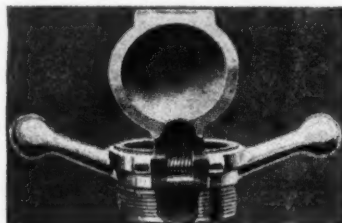


### FYRAC FORD HEATER

A heating device for Ford cars, known as the Fyrac Ford Heater, has been brought out by the Fyrac Manufacturing Co., Rockford, Ill.

The Fyrac Heater attaches to the Ford manifold and carries the heat through a metal pipe to an outlet on the dash. The heat can be instantly regulated by the driver, or may be shut off entirely when desired.

This heater fits any Ford model. The retail selling price is \$2.50.



### SNAPPY CAP FOR FORD RADIATORS

Snappy Cap is the product of the Bethlehem Spark Plug Co., Bethlehem, Pa., and sells for \$1.25. It is highly nicked

with the cap finished in black enamel. A spring attachment does away with the necessity of unscrewing the cap when refilling the radiator is desired.

### LOCK-RITE SEAT LOCK

The Lock-Rite Seat Lock is a band of high carbon, cold rolled spring steel, encased in artificial leather with a loop on one end which is easily attached to frame work at back of cushion. The other end has a steel hasp of polished nickel with two openings for adjustment. The steel lock is of new design and comes in polished nickel. Complete (strap and lock), \$2.50. R. W. Saunders, 1108 Lincoln Place, Brooklyn, N. Y.

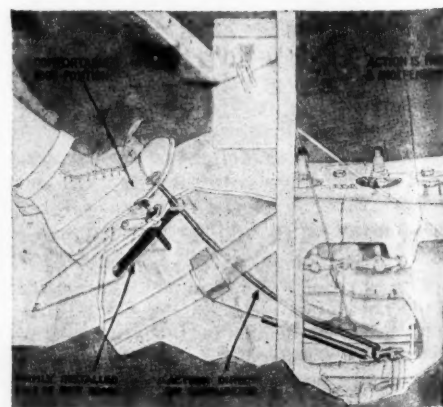


### CRESCENT PLIER

The Crescent Plier is the product of the Crescent Tool Co., Jamestown, N. Y., and is featured by its convenience for working in inaccessible places. A card, holding six of these pliers is supplied by the manufacturer and they sell for \$6 each. The tool is drop forged, hardened and oil treated, the bolt and nut are turned from the solid bar of steel.

### SNAP FOOT ACCELERATOR FOR FORDS

This accelerator has two parts and is easily installed. A positive action is given directly from the foot to the carburetor throttle in the line of pressure. The action of the hand throttle is independent from the throttle lever down to the carburetor arm. A bracket attached to the transmission cover plate affords necessary support for the pedal close up under the foot board but free of it. The foot rest is liberal in size and supports the foot in a comfortable position. Price, \$1.50. Morse Mfg. Co., Syracuse, N. Y.





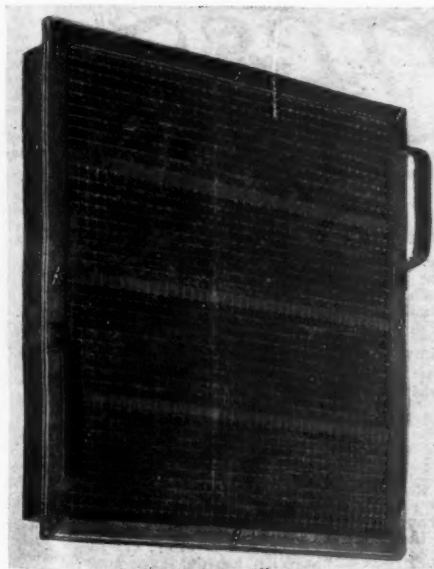
# SERVICE EQUIPMENT

## *Aids for Time Saving & Accuracy*

### REED AIR FILTERS

Several types of air filters are made by the Wm. Reed Mfg. Co., Louisville, Ky., which are adaptable to the automotive establishment. The dimensions of the frame of the one shown here are 22 ins. wide and 22 ins. long with a depth of four ins. over all. Each filtering unit has a capacity of 700 cu. ft. of air per minute at a resistance of .105 in. water gage.

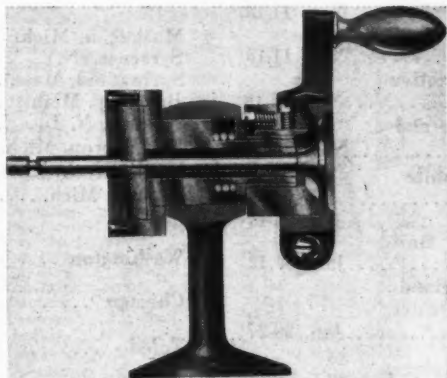
It is installed before the intake side of a fan or blower, the air being drawn through the filter of steel wool which is coated with Reed adhesine, which has for its base a non-volatile oil. As the air is being drawn through the filter, all particles, dust and impurities are held by the oily substances, so that clean, dry air is delivered to the room.



### BACON VULCANIZERS AND EQUIPMENT

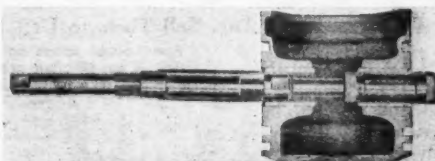
A complete line of gas, gasoline and electrically heated vulcanizing and tire repairing machines has been put on the market by the Bacon Vulcanizer Mfg. Co., Oakland, Cal. Automobile regulators, a feature of the equipment offered, prevent the heat from varying.

Tube repairing machines which permit as many as four punctures to be fixed at one time, tube presses, retreading and buffing machines are included in the products of the Bacon company. In addition to these accessories to repair work are also made tube deflators, wire wheel brushes, tire spreaders, steam curing bags and electric steam generators.



### WAYNE VALVE FACER

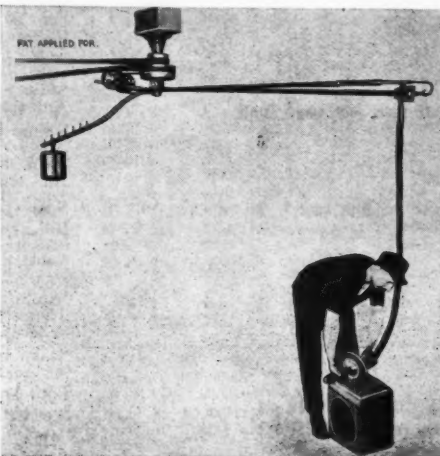
The Wayne Valve Facers were designed to eliminate chatter and tool marks on the finished valve. During the cutting operation the valve is supported all around by the hardened and ground surface of the cutter head and the valve stem is held rigidly by the chuck. List price \$15, including two cutters. Wayne Tool Mfg. Co., Waynesboro, Pa.



### NU-ANGLE EXPANSION REAMER

The Nu-Angle Line Reamer is designed with a pilot and expanding sleeve to facilitate the reaming of piston pin bushings where the two holes must be in line to insure a smooth working engine.

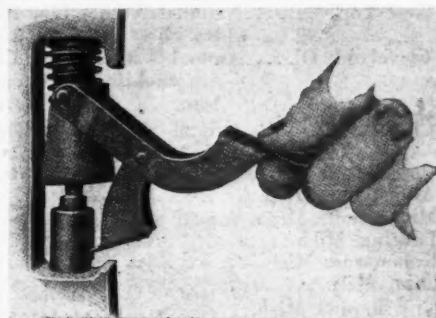
This reamer is made with six blades inserted on the Nu-Angle principle to prevent chatter or hogging in. Manufactured by Vedoe-Peterson Co., Norfolk Downs, Mass.



### STOW FLEXIBLE RADIAL GRINDER

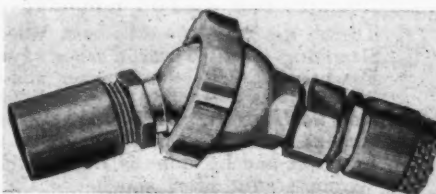
The flexible radial grinder is belt driven to the top of the flexible shaft and

the flexible shaft extends from the supporting arm down to the grinding wheel. It may also be furnished for drilling or with screw driver for assembling. The weight of the countershaft is balanced so that the operator is not obliged to support this weight. Stow Mfg. Co., Inc., Binghamton, N. Y.



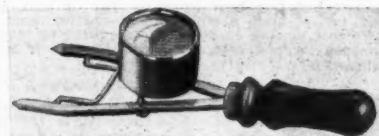
### TU-FORD VALVE LIFTING TOOL

The Tu-Ford Valve Lifting Tool raises the spring and automatically locks it in any position desired. It sells at \$1.—Frank Mossberg Co., Attleboro, Mass.



### MARS SWIVEL HOSE JOINT

For attachment to the gasoline pump hose, this joint allows the operator to move the hose in any direction. Mars Co., Aurora, Ill.



### RUBY CELL TESTER

The reading range of the Ruby Cell Tester is 2-0-2, this scale being closely graduated. The prongs are nicked and the wood handle highly finished. Price \$14, Ruby Mfg. Co., Springfield, O.



### SMOOTH CUT REAMER

The Smooth Cut Reamer is made by the Millersburg Reamer & Tool Co., Millersburg, Pa. The feature of this tool are the helical flutes which shear the metal, producing clean, smoothly finished holes. They are especially valuable for reaming holes having key-ways or oil grooves. Two types are made.

# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Wash'gton, City of Enclosed Car Salon.....	Oct. 21-28
Houston.....South Texas Fair.....	Nov. 8-18
Jersey City.....Third Annual Automobile Show.....	Nov. 11-18
Los Angeles.....Automobile Show, Motor Car Dealers' Association.....	Nov. 11-18
Chicago.....Annual Show of the Automotive Equipment Association.....	Nov. 13-18
Cincinnati, O.....Second Annual Automobile and Radio Exposition.....	Nov. 23-29
New York.....Eighteenth Annual Automobile Salon.....	Dec. 3-9
New York.....Annual Show.....	Jan. 6-13
New York.....National Automobile Body Builders' Show.....	Jan. 8-13
Cleveland, O.....Annual Winter Show, Cleveland Automobile Mfr's and Dealers' Assn.....	Jan. 20-27
Chicago.....Annual Show at Coliseum N. A. C. C.....	Jan. 27-Feb. 3
Chicago.....Annual Automobile Salon.....	Jan. 27-Feb. 3
Ann Arbor, Mich.....	Jan. 29-Feb. 3
Minneapolis, Minn.....Annual Show.....	Feb. 3-10
Lansing, Mich.....	Feb. 5-10
Kalamazoo, Mich.....	Feb. 12-17
Flint, Mich.....	Feb. 12-17
Gr'd Rapids, Mich.....	Feb. 19-24

Mt. Clemens, Mich.....	Feb. 19-24
Des Moines, Ia.....Annual Show.....	Feb. 23-Mar. 3
Brooklyn, N. Y.....Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Association.....	Feb. 24-Mar. 3
Muskegon, Mich.....	Feb. 26-Mar. 3
Syracuse, N.Y.....Annual Automobile Show.....	Feb. 26-Mar. 3
Springfield, Mass.....Annual Automobile Show.....	Feb. 26-Mar. 3
Bay City, Mich.....	Mar. 5-10
Newark, N. J.....Annual Automobile Show.....	Mar. 10-17
Port Huron, Mich.....	Mar. 12-17
Battle Creek, Mich.....	Mar. 19-24
Alpena, Mich.....	Apr. 2-7

## CONVENTIONS

Washington.....Second Annual Conference of the Highway Education Board.....	Oct. 2-23
Chicago.....Annual Meeting Automotive Equipment Association.....	Nov. 13-18
Toledo.....Annual Convention of the Ohio Automotive Trades' Assn.....	Dec. 6-8

## FOREIGN SHOWS

London.....Annual Show.....	Nov. 3-11
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## RACES

San Carlos, Calif.—500-Mile Armistice Day Race.....	Nov. 11
Los Angeles, Calif.....	Nov. 30
San Diego, Calif.....	January

# SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

## The Knocker

There's the guy the world over, who is always Slamming—and his words are always cold and go For naught. He's the knocker and I hate him And so does everyone; he even hates himself, And that's a fact. He is ever, always whining And as often he's complaining that the world Is wrong and he alone is right. He's the guy We meet quite often and he does a lot of Damage and the only way to beat him is to Knock. Knock him first in word and written and If that don't do the work, knock him for a row Of lilies, pure and sweet. O, the guy that's Always knocking, he's a burden to the world, Let's all get out and knock him for a goal, what say?

—J. V. M.

## HOW IT HAPPENED

The poet had just been awakened by: A man passing his house driving a four-year-old car, a boob piloting a high-powered machine with the cut-out wide open, a motorcyclist making 50 miles an hour with no muffler. Whereupon the poet arose and wrote the now famous line: "O, for a lodge in some vast wilderness!"

## The Owners' Wail

Autumn leaves are falling  
And toppled is the grass,  
Everything is dropping,  
Except the price of gas.

## Who?

What movie star will enter the Indianapolis races again this year, and why? Only three guesses, now.

## Memory Tests

### Questions

Who was the first man to say, "Maybe it's the carburetor?"  
Why did he say it?  
When was the first successful automobile made and who was the first buyer?  
Where did the saying, "They're a bunch of robbers," originate?  
What is carbon?

### Answers

We'd like to know.  
See above.  
Guess.  
In the blacksmith shop.  
Appendicitis of the motor.

## AND THEN WHAT?

"Does your wife drive the car?"

"Why, she seems to have a little difficulty in cranking it."

"It's an easy matter to take the trouble out of that."

"Oh, no trouble at all. She can crank it fine only when the lever happens to catch in the crankshaft."—Tom Wallace, Indianapolis.

The man who "hitches his wagon to a star" will soon be in the market for an automobile.

Some doctor jumps up to remark that he has just discovered the "automobile foot" which is an affliction caused by keeping the foot on the accelerator. He's all wrong—motorcycle cops found this disease a long time ago.

## A Story About Bills—

(Young, Old and Collecting)

Old Bill Gee run a blacksmith shop  
Busiest place in town.  
He knew each hawss and all its tricks  
Fer twenty mile aroun'.  
He could iron a thill or a whiffletree  
With any smith a-goin'  
An' with wisest words on thrush or heaves  
Bill's lips was allus flowin'.

He knew his neighbors inside out  
The boys who paid in cash  
The "Wait a whiles" and the allus-brokes  
So Bill he dodged a smash.

Time come when hawsses they got skeerce  
An' Bill got rheumatiz  
While his hammer-arm was no more good  
He'd sit in that shop o' his.

Still breathin' smoke—but from burnin' gas  
Instead of singein' hoof,  
Fer Young Bill started a flivver-shop  
Under the old man's roof.

An' the same things happened that did before  
The motor age come in;  
Some flivvers was good as solid gold  
An' some was mean as sin.

Young Bill was good at grindin' valves  
An' scrapin' bearin's true;  
He'd give one look, a poke an' twist  
An' tell you what to do.

Some people said "I'll pay next month.  
Bill says, as nice as pie:  
"All right" or "No" or "druthernot"—  
A-watchin' his dad's eye.

Now both Bills ride in a eight-in-line  
An' the old shop's gone fer good.  
Theres' tile an' glass an' flowers an' grass  
Where the forge an' anvil stood.

"Like pa, like son," the neighbors says,  
An' mebbe they are right.  
Both knowed their trade an' customers  
An' both of 'em was WHITE.—Jones.

## AH, YES.

"There's a difference," says the philosopher, says he, "there's a difference between going down to work and getting down to work."

"Early to bed and early to rise, makes a man healthy, wealthy and wise," may have been all right, but what about the guy who said, "Wise men burn the midnight oil"?



## Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive						
				Front	Rear					Front	Rear					Front	Rear						
Acason.....	3-1	\$1650n	3 1/2 x 5 1/2	34x5n	34x5n	W	Commerce.....	18	2150	4 1/2 x 5 1/2	36x4	36x7	I	Gary.....	K	3 1/2	37x5	36x5	40x5d	W			
Acason.....RB	1 1/2	1950	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Commerce.....	18	2495	4 1/2 x 5 1/2	36x6n	40x8n	W	Gary.....	M	5	4450	5 x 6 1/2	36x6	40x6d	W		
Acason.....H	2 1/2	2750	4 1/2 x 5 1/2	36x4k	36x8k	W	Commerce.....	25	2425	4 1/2 x 5 1/2	36x4	36x7	W	Gersix.....	M	1 1/2	3100	4 x 5 1/2	36x3 1/2	36x7	W		
Acason.....L	3 1/2	3450	4 1/2 x 5 1/2	36x5k	36x10k	W	Commerce.....	25	2770	4 1/2 x 5 1/2	36x6	40x8n	W	Gersix.....	K	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W		
Acason.....M	5	4350	5 x 6 1/2	36x6	40x12	W	Cook.....	51	3600	4 x 5 1/2	36x6n	40x8n	W	Gersix.....	K	3 1/2	4500	4 1/2 x 6	36x5	40x12	W		
Ac.....	30 (1-1)	2400	3 1/2 x 5 1/2	34x3 1/2	34x6	W	*Corbitt.....	34-1	1250	3 1/2 x 5 1/2	33x5n	33x5n	W	Gotfredson.....	20	1	2075	3 1/2 x 5 1/2	34x5	34x5	W		
Ac.....	40	2850	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt.....	E-22	1480	3 1/2 x 5 1/2	34x3 1/2	34x4	W	Gotfredson.....	31	1 1/2-2	3000	4 x 5 1/2	36x6	38x7n	W		
Ac.....	60	3400	4 1/2 x 5 1/2	36x4	36x8	W	Corbitt.....	D-22	2200	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Gotfredson.....	A	2 1/2	3375	4 x 5 1/2	36x4	36x7	W		
Acme.....	20	1	3 1/2 x 5 1/2	35x5n	35x5n	W	Corbitt.....	C-22	2800	4 1/2 x 5 1/2	36x3 1/2	36x7	W	Gotfredson.....	B	3 1/2-4	4475	4 1/2 x 5 1/2	36x5	36x10	W		
Acme.....	30	1 1/2	3 1/2 x 5 1/2	34x5	34x5	W	Corbitt.....	B-22	3000	4 1/2 x 5 1/2	36x4	36x7	W	Gotfredson.....	100	5-6	5500	5 x 6 1/2	36x6	40x14	W		
Acme.....	40	2	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Corbitt.....	R-22	3200	4 1/2 x 5 1/2	36x4	36x8	W	Graham Bros.....	1	1	1285	3 1/2 x 4 1/2	33x4 1/2	34x5n	B		
Acme.....	60	3	4 1/2 x 5 1/2	36x4	36x7k	W	Corbitt.....	A-22	3800	4 1/2 x 5 1/2	36x5	36x10	W	Graham Bros.....	1 1/2	1	1325	3 1/2 x 5	33x4 1/2	34x5n	B		
Acme.....	90	4 1/2	4 1/2 x 5 1/2	36x4	40x10	W	Corbitt.....	AA-22	4500	4 1/2 x 6	36x6	40x6d	W	*Gramm-Pion.....	10	1	1245	3 1/2 x 5	33x5n	33x5n	B		
Acme.....	125	6 1/2	4 1/2 x 6	36x6	40x12	W	Day-Elder.....	AS	1	1600	3 1/2 x 5	35x5n	35x5n	W	*Gramm-Pion.....	15	1 1/2-2	1750n	3 1/2 x 5	36x3 1/2	36x5k	I	
American.....	25	2 1/2	4 x 6	36x4k	36x4dk	W	Day-Elder.....	B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	*Gramm-Pion.....	45	1 1/2-2	2250n	3 1/2 x 5	36x3 1/2	36x5	W	
American.....	40	4	4 1/2 x 6	36x5k	36x5dk	W	Day-Elder.....	D	2	2400	3 1/2 x 5	36x4	36x7	W	*Gramm-Pion.....	20	2-2 1/2	2475n	4 1/2 x 5 1/2	36x4k	36x7k	W	
American.....	50	5	4 1/2 x 6	36x5	36x12	W	Day-Elder.....	C	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	*Gramm-Pion.....	30	3	3300n	4 1/2 x 5 1/2	36x5k	36x5dk	W	
Armleder.....	20	1	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Day-Elder.....	F	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W	*Gramm-Pion.....	75P	3 1/2	4225n	4 1/2 x 5 1/2	36x5n	42x5n	W	
Armleder.....	21	1 1/2	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Day-Elder.....	E	5	4250	4 1/2 x 6	36x5k	40x6dk	W	*Gramm-Pion.....	40	5-6	3850n	4 1/2 x 5 1/2	36x5n	36x5dk	W	
Armleder.....	40-B	1 1/2	4 1/2 x 5 1/2	36x4k	36x7k	W	Dearborn.....	E	1	1600	3 1/2 x 5 1/2	35x5n	35x5n	W	*Gramm-Pion.....	50	5-6	4450n	4 1/2 x 6	36x6	40x6dk	W	
Armleder.....	40-C	1 1/2	4 1/2 x 5 1/2	36x4k	36x7k	W	Dearborn.....	FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Hall.....	1 1/2	1 1/2	3100	3 1/2 x 5	34x5n	38x7n	W	
Armleder.....	HW-B	2 1/2	4 1/2 x 5 1/2	36x4k	36x7k	W	Dearborn.....	F	1 1/2	2180	3 1/2 x 5 1/2	34x4	34x5	W	Hall.....	2 1/2	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W	
Armleder.....	HW-C	2 1/2	4 1/2 x 5 1/2	36x4k	36x7k	W	Dearborn.....	48	2	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W	Hall.....	3 1/2	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W	
Armleder.....	KW-B	3 1/2	4 1/2 x 5 1/2	36x5k	36x5dk	W	Defiance.....	G	1	1525	3 1/2 x 5 1/2	35x5n	35x5n	B	Hall.....	5	5	5100	4 1/2 x 5 1/2	36x5	40x6d	W	
Armleder.....	KW-C	3 1/2	4 1/2 x 5 1/2	36x5k	36x5dk	W	Defiance.....	D	1 1/2	1815	3 1/2 x 5 1/2	35x5n	36x6n	I	Hall.....	7	7	5100	4 1/2 x 5 1/2	36x5	40x6d	C	
*Atlas.....	22	1	3 1/2 x 5 1/2	34x4 1/2	34x4 1/2	W	Defiance.....	E	2	2075	3 1/2 x 5 1/2	35x5n	38x7n	I	Harvey.....	W OA	2	2650	4 1/2 x 5 1/2	34x4	34x7	W	
*Atlas.....	44	1 1/2-2	3 1/2 x 5 1/2	36x6n	36x6n	W	Denby.....	31	1 1/2	1485	3 1/2 x 5 1/2	35x5n	35x5n	B	Harvey.....	W FA	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W	
Atterbury.....	20R	1 1/2	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Denby.....	33	1 1/2	2145	3 1/2 x 5 1/2	35x5n	38x7n	I	Harvey.....	W HA	3 1/2	3650	4 1/2 x 5 1/2	36x5	36x5d	W	
Atterbury.....	22C	2 1/2	4 1/2 x 5 1/2	36x4	36x4d	W	Denby.....	35	2 1/2-3	2795	4 1/2 x 5 1/2	36x4	36x7	I	Hawkeye.....	K	1 1/2	1375	3 1/2 x 5 1/2	34x5n	34x5n	W	
Atterbury.....	22C	2 1/2	4 1/2 x 5 1/2	36x4	36x4d	W	Denby.....	27	4	3895	4 1/2 x 5 1/2	36x5	36x5d	I	Hawkeye.....	M	2	1645	3 1/2 x 5 1/2	34x3 1/2	34x5k	I	
Atterbury.....	22D	3 1/2	4 1/2 x 5 1/2	36x5	40x5d	W	Dependable.....	210	5	4295	4 1/2 x 5 1/2	36x6	40x6d	I	Hawkeye.....	M	2	2145	4 1/2 x 5 1/2	36x4k	36x6k	I	
Atterbury.....	22D	3 1/2	4 1/2 x 5 1/2	36x5	40x5d	W	Dependable.....	C	2	2350	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Hawkeye.....	N	3 1/2	3700	4 1/2 x 5 1/2	36x5k	36x10k	I	
Atterbury.....	8E	5	4 1/2 x 6	36x5	40x6d	W	Dependable.....	D	2 1/2	2650	4 x 5 1/2	35x5	36x6	W	Hendrickson.....	O	1 1/2	2200	3 1/2 x 5 1/2	36x4n	36x5n	W	
Atterbury.....	8E	5	5125	1 1/2 x 6	36x5	40x6	W	Dependable.....	E	3	2950	4 1/2 x 5 1/2	36x4	36x7	W	Hendrickson.....	N	2 1/2	2690	4 1/2 x 5 1/2	36x4k	36x5k	W
Autocar.....	21UF	1 1/2-2	1050	4 1/2 x 5 1/2	34x4k	34x6	D	Diamond T.....	O-3	1-1 1/2	1975	3 1/2 x 5 1/2	36x3 1/2	36x4n	W	Hendrickson.....	M	3	3000	4 1/2 x 5	36x5k	36x5dk	W
Autocar.....	21UG	1 1/2-2	2050	4 1/2 x 5 1/2	34x4k	34x6	D	Diamond T.....	T	1 1/2	2250	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Hendrickson.....	K	5	4000	5 x 6 1/2	36x6	40x6	W
Autocar.....	27H	2-3	2950	1 x 5 1/2	34x5	36x7	D	Diamond T.....	U	2-2 1/2	2650	4 x 5 1/2	36x4	36x7	W	Huffman.....	B	1 1/2-2	1795	3 1/2 x 5	34x3 1/2	34x6	W
Autocar.....	27K	2-3	3075	1 x 5 1/2	34x5	36x7k	D	Diamond T.....	K	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5d	W	Huffman.....	C	1 1/2-2	1695	3 1/2 x 5 1/2	36x3 1/2	36x6	I
Autocar.....	26-B	4-6	4100	1 1/2 x 5 1/2	34x6	38x12	D	Diamond T.....	EL	5	4325	4 1/2 x 5 1/2	36x6	40x6d	W	Huffman.....	D	2-3	2805	4 1/2 x 5 1/2	36x4	36x7	W
Available.....	H1 1/2	1 1/2	2475	1 x 5	36x3 1/2	36x5k	W	Diamond T.....	S	5	4500	4 1/2 x 6	36x6	40x6d	W	Hurlburt.....	A-A	1-1 1/2	1050	3 1/2 x 5 1/2	34x5n	34x5n	W
Available.....	H2	2	2775	4 x 5	36x3 1/2	36x6k	W	Doane.....	2 1/2	4100b	4 1/2 x 5 1/2	36x5	36x7	C	Hurlburt.....	B-B	2-2 1/2	2900	4 1/2 x 5 1/2	36x4k	36x6k	W	
Available.....	H2 1/2	2 1/2	3160	4 x 5	36x4k	36x8k	W	Doane.....	3 1/2	5100b	4 1/2 x 5 1/2	36x5	36x5d	C	Hurlburt.....	C-C	3-3 1/2	3475	4 1/2 x 5 1/2	36x5	36x5d	W	
Available.....	H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5d	W	Doane.....	6	6000b	5 x 6 1/2	36x6	40x6d	C	Hurlburt.....	D-D	4-4 1/2	4150	4 1/2 x 6	3 x 5	36x6d	W	
Available.....	H5	5	5375	5 x 6	36x6	40x12	W	*Dodge Brothers.....	K-2	3 1/2	730	3 1/2 x 4 1/2	32x4n	32x4n	B	Hurlburt.....	E-E	6-6 1/2	4850	4 1/2 x 6 1/2	36x6	40x6d	W
*Avery.....	1	.....	3 x 4n	34x5n	34x5n	I	Dorris.....	K-2	1	2490	4 x 5 1/2	33x5n	33x5n	B	Indep'd (Iowa) B	1	1045	3 1/2 x 5	34x3 1/2	34x4	I		
Beck.....	A Jr.	1 1/2	1285n	3 1/2 x 5	34x4 1/2	34x4 1/2	I	Dorris.....	K-4	2-2 1/2	3400	4 1/2 x 5 1/2	36x4	36x7	W	Indep'd (Iowa) G	1 1/2	2065	4 1/2 x 5 1/2	34x3 1/2	34x5	I	
Beck.....	B-30	1 1/2	1350	3 1/2 x 5	34x5	36x6	I	Dorris.....	K-7	3 1/2	4400	4 1/2 x 5 1/2	36x5	36x10	W	Indep'd (Ia.) HI	2 1/2	2940	4 1/2 x 5 1/2	36x4	36x7	I	
Beck.....	C-40	2	1550	3 1/2 x 5	36x6	36x6	W	*Dort.....	103	1	685n	3 1/2 x 5	31x4n	34x4n	B	*Indiana.....	10	.....	3 1/2 x 5 1/2	34x5n	34x5n	B	
Beck.....	D-50	2 1/2	1950	4 1/2 x 5 1/2	36x7	40x8	W	Double Drive.....	B	3	4000	4 1/2 x 5 1/2	36x6	36x6	W	Indiana.....	12	1 1/2-2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5k	W
Bell.....	M (Iowa)	1 1/2	1495	3 1/2 x 5 1/2	35x5	35x5n	W	Duplex.....	A	2	2775	4 x 5 1/2	35x5n	38x7n	W	Indiana.....	25	2 1/2-3	.....	4 1/2 x 5 1/2	36x4k	36x7k	W
Bell.....	O (Iowa)	1 1/2	2100	3 1/2 x 5 1/2	34x3 1/2	34x5	I	Duty.....	22	2	3500	4 1/2 x 5 1/2	36x8	38x8	W	Indiana.....	35	3-4	.....	4 1/2 x 5 1/2	36x5k	36x5dk	W
Bell.....	O (Iowa)	2 1/2	2550	4 1/2 x 5 1/2	34x4	34x6	I	Eagle.....	101	1 1/2	1875	3 1/2 x 5 1/2	34x5	34x5	I	Indiana.....	51	5-7	.....	5 x 6 1/2	36x5k	40x6dk	W
Bessemer.....	G	1	.....	3 1/2 x 5	35x5n	35x5n	I	Eagle.....	100-2	2	2275	3 1/2 x 5 1/2	34x4k	34x7k	I	*International.....	S	1	1250	3 1/2 x 5	32x4 1/2	32x4 1/2	I
Bessemer.....	H-2	1 1/2	.....	3 1/2 x 5	36x3 1/2	36x5	D	F. W. D.....	B	3	4200	4 1/2 x 5 1/2	36x6	36x6	B	*International.....	21	1	1550	3 1/2 x 5 1/2	36x3 1/2	36x3 1/2	I
Bessemer.....	J-2	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x4d	I	Fageol.....	1 1/2	1	3000	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	*International.....	31						

## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Kleiber.....BB	2	\$3000	1 1/2 x 5 1/2	36x4k 36x7k	W	Old Hickory.....W	1	\$1775	3 1/2 x 5	36x3 1/2 36x4k	W	Seneca.....M	1 1/2	\$ 820	3 1/2 x 4 1/2	30x3 1/2 30x3 1/2	B
Kleiber.....B	2 1/2	3950	1 1/2 x 5 1/2	36x4k 36x8	W	Old Reliable.....A	1 1/2	2350	4 x 5	34x4 36x6	W	*Service.....12	1 1/2	.....	3 1/2 x 4 1/2	32x4 1/2 32x4 1/2	B
Kleiber.....C	3 1/2	4900	1 1/2 x 5 1/2	36x4k 36x8 1/2	W	Old Reliable.....B	2 1/2	3500	4 1/2 x 6	34x4 36x4 1/2	W	*Service.....25	1 1/2	.....	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	B
Kleiber.....D	5	5300	1 1/2 x 5 1/2	36x4k 40x12	W	Old Reliable.....C	3 1/2	4250	4 1/2 x 6	36x5 36x5 1/2	W	*Service.....21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Koehler.....M	1 1/2	2150	1 x 5 1/2	36x4 36x7	W	Old Reliable.....D	5	5000	4 1/2 x 6	36x6 40x6 1/2	W	*Service.....32	2	.....	4 x 5 1/2	36x3 1/2 36x7	W
Koehler.....MCS	2 1/2	3175	1 x 5 1/2	36x4 36x7	W	*Oldsmobile Econ	1	1095	1 1/2 x 5 1/2	36x6 40x7 1/2	C	*Service.....37	2	.....	4 1/2 x 5 1/2	35x5 1/2 38x7 1/2	W
Koehler.....F	3 1/2	4170	1 1/2 x 5 1/2	36x4 36x10	W	Olympic.....A	2 1/2	3200	1 1/2 x 5 1/2	36x4 36x8	W	*Service.....72	3 1/2	.....	4 1/2 x 5 1/2	36x4 36x8	W
Koehler.....MT	5	3275	1 x 5 1/2	36x4 36x7	W	Onida.....B	1 1/2	2825	4 x 5 1/2	36x3 1/2 36x7	W	*Service.....77	4	.....	4 1/2 x 5 1/2	36x5 36x8 1/2	W
Krebs.....23	1 1/2	1360	3 1/2 x 5	34x4 1/2 34x4 1/2	B	Onida.....C	2 1/2	3700	4 x 5 1/2	36x4 36x8	W	*Signal.....102	6	.....	3 1/2 x 5	36x6 40x6 1/2	W
Krebs.....24	1 1/2	1675	3 1/2 x 5	34x4 1/2 34x4 1/2	B	Onida.....D	3 1/2	4050	4 1/2 x 5 1/2	36x4 36x10	W	*Signal.....NF	1	1450	3 1/2 x 5	34x5 1/2 36x6 1/2	W
Krebs.....45	2 1/2	2275	4 1/2 x 5 1/2	36x4 36x7	W	Oshkosh.....A	2	4725	3 1/2 x 5	36x6 40x12	B	*Signal.....J	1 1/2	1950	4 1/2 x 5 1/2	34x4 36x8	W
Krebs.....L-4	3 1/2	2550	4 1/2 x 5 1/2	36x4 36x8	W	Oshkosh.....AA	2	2485	3 1/2 x 5	36x6 36x6 1/2	B	*Signal.....M	2 1/2	2375	4 1/2 x 5 1/2	34x4 36x8	W
Krebs.....110	3 1/2	3175	4 1/2 x 5 1/2	36x5 40x10	W	Oshkosh.....B	2 1/2	2585	3 1/2 x 5	36x6 36x6 1/2	B	*Signal.....R	5	3900	4 1/2 x 5	36x5 40x5 1/2	W
Larrabee.....X-2	1 1/2	1925	3 1/2 x 4 1/2	34x5 34x5 1/2	B	Oshkosh.....BB	2 1/2	3485	1 x 5 1/2	38x7 1/2 38x7 1/2	B	*Signal.....R	5	3900	4 1/2 x 5	36x5 40x5 1/2	W
Larrabee.....U	1 1/2	2100	3 1/2 x 4 1/2	34x5 34x5 1/2	B	*Overland.....4	1 1/2	3565	1 x 5 1/2	38x7 1/2 38x7 1/2	B	*Standard.....1-K	1 1/2	1330	3 1/2 x 5	33x5 1/2 33x5 1/2	W
Larrabee.....J	1 1/2	2400	3 1/2 x 4 1/2	34x5 34x5 1/2	B	Peckard.....EC	2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	*Standard.....1-K	1 1/2	1600	3 1/2 x 5	34x3 1/2 34x5k	W
Larrabee.....K	1 1/2	3100	3 1/2 x 4 1/2	34x5 34x5 1/2	B	Peckard.....EX	2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	*Standard.....1-K	1 1/2	2400	3 1/2 x 5	34x3 1/2 34x5k	W
Larrabee.....K-5	2 1/2	3450	4 1/2 x 5 1/2	36x5 36x5 1/2	W	Peckard.....ED	3-4	4100	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Standard.....66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x5 1/2	W
Larrabee.....W	5-7	4800	4 1/2 x 6	36x6 40x6 1/2	W	Peckard.....EF	5-7 1/2	4500	5 x 5 1/2	36x6 40x6 1/2	W	*Standard.....66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x5 1/2	W
Maccar.....L	1 1/2	.....	1 1/2 x 5 1/2	36x4 36x6	W	Paige.....52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	*Star.....5-K	5-7	4100	3 1/2 x 5	30x3 1/2 30x3 1/2	B
Maccar.....H-A	2	.....	1 1/2 x 5 1/2	36x4 36x6 1/2	W	Paige.....54-20	2 1/2	2120	4 1/2 x 5 1/2	34x4 34x8	W	*Sterling.....1 1/2	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5k	W
Maccar.....H-2	3	.....	1 1/2 x 5 1/2	36x4 36x6 1/2	W	Paige.....51-19	3 1/2	3145	4 1/2 x 5 1/2	34x4 34x8	W	*Sterling.....2	2	3085	4 x 5 1/2	36x4k 36x6k	W
Maccar.....M-3	4	.....	1 1/2 x 5 1/2	36x5 36x6 1/2	W	Parker.....C-22	1	1875	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Sterling.....2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4k 36x4 1/2	W
Maccar.....G	5-6	.....	1 1/2 x 5 1/2	36x5 36x6 1/2	W	Parker.....G-22	2 1/2	3200	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Sterling.....3 1/2	3 1/2	4325	4 1/2 x 5 1/2	36x5k 40x5 1/2	W
MacDonald.....A	1 1/2	5750	1 1/2 x 5 1/2	36x4 40x14	W	Parker.....M-20	5	4850	5 x 5	36x6 40x6 1/2	W	*Sterling.....5-W	5	4950	5 x 5 1/2	36x6 40x6 1/2	W
Mack.....AB D.R.	1 1/2	3450	1 x 5	36x4k 36x3 1/2 36x4k	D	Patriot.....Reverse	1	1383	3 1/2 x 5	35x5 1/2 35x5 1/2	W	*Sterling.....5-C	5	6500	5 x 5 1/2	36x6 40x6 1/2	C
Mack.....AB Chain	1 1/2	3000	1 x 5	36x4k 36x3 1/2 36x4k	D	Patriot.....Lincoln	2	2050	4 x 5 1/2	34x4 34x8	W	*Sterling.....7 1/2	7 1/2	6000	5 x 5 1/2	36x6 40x6 1/2	C
Mack.....AB Chain	2	3300	1 1/2 x 5	36x4k 36x4 1/2 36x4k	D	Patriot.....LS-900	2	2175	4 x 5 1/2	34x4 34x8	W	*Stewart.....Utility	1 1/2	1245	3 1/2 x 5	34x4 1/2 34x4 1/2	I
Mack.....AB D.R.	2 1/2	3750	1 1/2 x 5	36x4k 36x4 1/2 36x4k	D	Patriot.....Wash'n	3	2900	4 1/2 x 5 1/2	36x5 36x7	W	*Stewart.....10-X	10-X	1445	3 1/2 x 5	34x4 1/2 34x4 1/2	I
Mack.....AC Chain	3 1/2	3850	1 1/2 x 5	36x4k 36x4 1/2 36x4k	D	Pierce-Arrow.....3 1/2	3 1/2	3200	4 x 5 1/2	36x4 36x4 1/2	W	*Stewart.....10-X	10-X	3190	3 1/2 x 5	36x5 36x10	I
Mack.....AC Chain	3 1/2	3400	1 1/2 x 5	36x4k 36x4 1/2 36x4k	D	Pierce-Arrow.....3 1/2	3 1/2	3200	4 x 5 1/2	36x4 36x4 1/2	W	*Stewart.....10-X	10-X	3190	3 1/2 x 5	36x5 36x10	I
Mack.....AC Chain	3 1/2	4950	5 x 6	36x5k 40x5 1/2 36x5k	C	Pierce-Arrow.....3 1/2	3 1/2	4350	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Stoughton.....C	1	1095	3 1/2 x 5	34x4 1/2 34x4 1/2	B
Mack.....AC Chain	3 1/2	5500	5 x 6	36x6 40x6 1/2 36x6	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Stoughton.....A	1	1700	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	W
Mack.....AC Chain	3 1/2	5750	5 x 6	36x6 40x6 1/2 36x6	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Stoughton.....B	1 1/2	2150	3 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack.....AC Chain	3 1/2	6000	5 x 6	36x7 40x7 1/2 36x7	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Stoughton.....D	2	2490	4 x 5 1/2	36x4 36x7	W
Mack Trac.....AB	5	3400	1 1/2 x 5	36x4 36x4 1/2 36x4	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Stoughton.....E	3	3150	4 1/2 x 5 1/2	36x5 1/2 36x5 1/2	W
Mack Trac.....AC	7	4950	5 x 6	36x5 40x5 1/2 36x5	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Sullivan.....H	3 1/2	2800	4 1/2 x 5 1/2	36x4k 36x7k	W
Mack Trac.....AC	10	5500	5 x 6	36x6 40x6 1/2 36x6	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W	*Sullivan.....H	3 1/2	3750	4 1/2 x 5 1/2	36x5 36x5 1/2	W
Mack Trac.....AC	13	6750	5 x 6	36x6 40x6 1/2 36x6	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
Mack Trac.....AC	15	6000	5 x 6	36x7 40x7 1/2 36x7	C	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Mapleleaf.....AA	1 1/2	3000	3 1/2 x 5 1/2	34x5 36x5 1/2	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Mapleleaf.....AA	2	3600	4 x 5 1/2	36x4 36x7	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Mapleleaf.....AA	3	4050	4 1/2 x 5 1/2	36x4 36x7 1/2	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Mapleleaf.....CC	4	4800	4 1/2 x 5 1/2	36x5 36x5 1/2	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Mapleleaf.....DD	5	5625	4 1/2 x 5 1/2	36x6 40x6 1/2	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....JD	1 1/2	2290	4 1/2 x 5 1/2	31x3 1/2 31x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....JD	1 1/2	2590	4 1/2 x 5 1/2	31x3 1/2 31x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....A	3 1/2	3990	4 1/2 x 5 1/2	34x4 36x7	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....E	3 1/2	4290	4 1/2 x 5 1/2	34x4 36x7	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....Y	4	4490	4 1/2 x 5 1/2	36x5 40x5 1/2	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....B	5	4990	4 1/2 x 5 1/2	36x6 40x6 1/2	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master.....F	5	5090	4 1/2 x 5 1/2	36x6 40x6 1/2	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Master Trac.....DDT	9	932	3 1/2 x 5 1/2	32x3 1/2 32x5	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Maxwell.....1 1/2	1 1/2	330	3 1/2 x 5 1/2	32x3 1/2 32x5	D	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....HT	1-1 1/2	1650	4 x 5	34x5 34x5 1/2	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....H	1 1/2	2000	3 1/2 x 5 1/2	34x3 1/2 34x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....H	1 1/2	2175	4 x 5	36x3 1/2 36x5	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....D	1-2 1/2	2875	4 x 5	36x4 36x8	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....G	3 1/2	3800	4 1/2 x 5 1/2	36x5 36x10	W	Pittsburgh.....1 1/2-2	1 1/2-2	4850	4 1/2 x 5 1/2	36x5 36x5 1/2	W						
*Memomine.....J-3	5	4250	1 1/2 x 6	36x6 40x12	W	Pittsburgh.....1 1/2-2	1 1/2-2</										



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Veteran.....P**	2	\$3699	1 1/2 x 5 1/2	30x4 36x7	W	White.....20	2	\$3250	3 1/2 x 5 1/2	36x4k 36x7k	D	Wichita.....O	4	\$3500	4 1/2 x 6 1/2	36x5k 36x5k	W
Veteran.....R**	3	4200	1 1/2 x 5 1/2	36x4 36x7	W	White.....40	3 1/2	4200	3 1/2 x 5 1/2	36x5 40x5d	D	Wilcox.....AA	1	1900	3 1/2 x 5 1/2	36x1k 36x4k	W
Veteran.....S**	4	5395	1 1/2 x 5 1/2	36x5 36x10	W	White.....45	5	4500	1 1/2 x 5 1/2	36x6 40x6d	D	Wilcox.....BB	1 1/2	2550	4 1/2 x 5 1/2	36x4 36x5	W
*Vim.....29	1 1/2	1050	3 1/2 x 4 1/2	31x4n 31x4n	W	White Hick.....E	1	1225	3 1/2 x 5 1/2	31x5n 31x5n	W	Wilcox.....D	2 1/2	3000	4 1/2 x 5 1/2	36x4k 36x3 1/2 k	W
*Vim.....50	1 1/2	995	4 x 5	32x4n 32x4n	B	White Hick.....H	1 1/2	1375	3 1/2 x 5 1/2	36x3 1/2 36x5	W	Wilcox.....E	3 1/2	3950	4 1/2 x 5 1/2	36x5k 36x5k	W
Walker-Johnson A	2	2500	3 1/2 x 5 1/2	34x3 1/2 34x6	W	White Hick.....K	2 1/2	1675	1 1/2 x 5 1/2	36x4 36x5	W	Wilcox.....F	5	4350	4 1/2 x 6 1/2	36x5 40x6d	W
Walker-Johnson B	3	3000	4 1/2 x 5 1/2	36x4 36x8	W	Wichita.....K	1	1875	3 1/2 x 5 1/2	36x3 1/2 36x4k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5 1/2	36x3 1/2 36x5	W
Walter.....M	2 1/2	3850	4 1/2 x 5 1/2	36x4 36x8	D	Wichita.....MI	2	2400	1 1/2 x 5 1/2	36x3 1/2 36x4k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	36x4 36x7	W
Walter.....S	5	4850	4 1/2 x 5 1/2	36x6 40x6d	W	Wichita.....RX	3	3200	4 1/2 x 5 1/2	36x4k 36x8k	W	Wilson.....G	3 1/2	3685	4 1/2 x 5 1/2	36x5 36x5	W
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5n 35x5n	W							Wilson.....H	5	4520	4 1/2 x 6 1/2	36x6 40x6	W
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	36x5 36x10	W							*Wisconsin.....A	1	1750	3 1/2 x 5 1/2	31x5n 34x5n	W,B
Western.....W1 1/2	1 1/2	2450	4 1/2 x 5 1/2	36x3 1/2 36x5k	W							Wisconsin.....B	1 1/2	2100	3 1/2 x 5 1/2	35x5 36x6	W
Western.....L1 1/2	1 1/2	2450	4 1/2 x 5 1/2	36x3 1/2 36x5k	W							Wisconsin.....C	2 1/2	2700	4 x 5 1/2	36x6n 36x7	W
Western.....W2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4 36x7	W							Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	36x6n 40x8	W
Western.....L2 1/2	2 1/2	2450	4 1/2 x 5 1/2	36x4 36x7	W							Wisconsin.....E	5	3500	4 1/2 x 6 1/2	36x6 36x10	W
Western.....W3 1/2	3 1/2	4000	4 1/2 x 5 1/2	36x5 40x5d	W							Wisconsin.....F	7	4000	5 x 6 1/2	36x6 36x12	W
*White.....15	1 1/2	2400	3 1/2 x 5 1/2	34x5n 34x5n	B							Witt-Will.....N	1 1/2	2450	3 1/2 x 5 1/2	36x3 1/2 36x6k	W
												Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	36x4k 36x8k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.  
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl.  
d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. \*—express truck or delivery wagon. \*\*—Canadian Make. trac—tractor.

## Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	
Allis-Chal. G.P.	6-12	\$250	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Fordson.....	18	\$ 395	4	Own	4-4x5	G.K	2-3	*Oldsmar.....K	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1	
Allis-Chalm.....	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Frisk.....A	12-20	....	4	Erld.	4-4 x 6	G,K	2-3	Pioneer.....G	18-36	....	4	Own	4-5 1/2 x 6	G,K,D	4	
Allis-Chalm.....	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Frisk.....C	15-28	....	4	Beav.	4-4 1/2 x 6	G,K	3-4	Pioneer.....C	40-75	....	4	Own	4-7 x 8	Gas.	10	
Allwork.....2-G	14-28	1595	4	Own	4-4 x 6	GorK	3								Plowman.....A	15-30	1295	4	Own	4-4 1/2 x 6	G,K	3-4		
Allwork.....C	14-28	1395	4	Own	4-5 x 6	GorK	3	Grain Belt...A	18-30	2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Reliable.....	10-20	390	4	Own	2-6 x 7	Ker.	2	
*ARO.1921-22	3-6	385	4	Own	1-4 1/2 x 5	Gas.	1	Gray.....	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Russell.....	12-21	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3	
Aultman-T.....	22-45	2870	4	Own	4-5 x 6 1/2	G,K,D	4	Gray.....	22-44	2165	3	Wauk.	4-5 x 6 1/2	Gas.	4-5	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4	
Aultman-T.....	30-60	4070	4	Own	4-7 x 9	G,K,D	8-10	Gr. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5	
Autocut. U-3	12-24	1250	4	Herco.	4-4 x 5 1/2	Gas.	2-3								Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10		
Avery. Slt. Cul.	6-10	....	3	Own	4-3 x 4	G,K	....	Hart-Parr.....20	20	865	4	Own	2-5 1/2 x 6 1/2	K,D.	2	Samson.....M	....	445	4	Own	4-4 x 5 1/2	G,K	2	
Avery. Cult-C	6-10	....	3	Own	4-3 x 4	G,K	....	Hart-Parr.....30	30	1045	4	Own	2-6 1/2 x 7	K,D.	3	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2	
Avery.....B	6-10	....	4	Own	4-3 x 4	G,K	....	Hart-Parr.....	....	1395	4	Own	6 1/2 x 7	K,D.	....	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4	
Avery.....C	8-10	....	4	Own	6-3 x 4	G,K	....	Heider.....D	9-16	628	4	Wauk.	4-4 1/2 x 6 1/2	G,K	2	Shelby.....	1	150	3	B & S	1-2 1/2 x 2 1/2	G	....	
Avery.....	12-20	....	4	Own	4-4 1/2 x 6	G,K,D	2-3	Heider.....Cult	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Shelby.....D	15-30	....	4	Beav.	4-4 x 6	G,K	3	
Avery.....	....	....	4	Own	4-4 1/2 x 6	G,K,D	2-3	Huber Light 4	12-25	985	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3	Shelby.....C	9-18	....	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2	
Avery.....	12-25	....	4	Own	2-6 1/2 x 7	G,K,D	2-3	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas	3									
Avery.....	14-28	....	4	Own	4-4 1/2 x 6	G,K,D	3-4								Indiana.....F	5-10	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2		
Avery.....	18-36	....	4	Own	4-5 1/2 x 6	G,K,D	4-5	International	8-16	1670	4	Own	4-4 1/2 x 5	G,K,D	2	Toro Cultivator	6	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2	
Avery.....	25-50	....	4	Own	4-6 1/2 x 7	G,K,D	5-6	Internat. Titan	10-20	1700	4	Own	2-6 1/2 x 8	G,K,D	3	Toro Tractor 22	6-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2	
Avery.....	45-65	....	4	Own	4-7 1/2 x 8	G,K,D	8-10	International..	15-30	1750	4	Own	4-5 1/2 x 8	G,K,D	4	Townsend.....	10-20	800	2	Own	4-6 1/2 x 7	Ker.	2-3	
Bates Mule. H	15-25	....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	*Kinkade.....	1 1/2-3	190	1	Own	1-3 x 3	Gas.	....	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4	
Bates Mule. F	18-25	....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3								Traction Motor	40-50	....	4	....	8 1/2 x 5	Gas.	4-5		
Bates Mule G	25-35	....	4	Midw.	4-4 1/2 x 6	Gas.	3	La Crosse.....	12-24	985	2	Own	2-6 x 7	G,K	3	Traylor.....TB	0-12	500	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	
Bea.....	25-35	4250	2	Ste.	4-4 1/2 x 6 1/2	Gas.	4	Lauson.....S	12-25	1295	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Trundaar.....10	25-40	3750	2	Wauk.	4-5 x 6 1/2	G or K	4	
*Boeman Jr.....	3 1/2-4 1/2	180	2	B & S	1-2 1/2 x 2 1/2	Gas.	....	Lauson.....21	15-30	1675	4	Beav.	4-4 1/2 x 6 1/2	G or K	3-4	Twin City.....	12-20	1200	4	Own	4-4 1/2 x 6	G,K	3	
*Boeman.....G	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	....	Lauson Road	15-30	2000	4	Beav.	4-4 1/2 x 6 1/2	K	....	Twin City.....	20-35	2750	4	Own	4-5 1/2 x 6 1/2	G,K	5-6	
Best.....	30	....	2	Own	4-4 1/2 x 6	G,K,D	4	Leader.....B	12-18	685	4	Own	2-6 x 6 1/2	G,K,D	2-3	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 9	G,K	8-10	
Best.....	60	....	2	Own	4-6 1/2 x 7	G,K,D	8-9	Leader.....N	16-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Uncle Sam C20	12-20	1295	4	Weid.	4-4 x 5 1/2	G	2-3	
*Bolens.....	....	....	4	B & S	1-2 1/2 x 2 1/2	G.	....	Leader.....GU	18-35	2150	2	Clim.	4-5 x 6 1/2	G,K	3-4	Uncle Sam B19	20-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4	
Boring.....	5-10	395	4	LeR.	4-3 1/2 x 4 1/2	G	....	Linn.....H	40	4500	....	* Cont.	4-4 1/2 x 5 1/2	Gas	4	Uncle Sam D21	20-30	1895	4	Beav.	4-4 1/2 x 6	G or K	3-4	
Boring.....1921	....	1850	3	Wauk	4-4 1/2 x 5 1/2	GorK	2	Linn.....W	60	5000	....	* Wauk	4-5 x 6 1/2	Gas	6	Utilitor.....501	2 1/2-4	295	4	Own	1-3 1/2 x 4 1/2	G	1	
*Bryan.....	15-30	....	4	Own	2-4 x 5	K.	3	Little Giant. B	16-22	2200	4	Own	4-4 1/2 x 5	K	4	Utilitor.....501A	2 1/2-4	340	4	Own	1-3 1/2 x 4 1/2	G	1	
								Little Giant. A	26-35	3300	4	Own	1-5 1/2 x 6	K	6									
Capital.....	15-30	1000	2	Own	4-4 x 6	Gas.	3	Lombard. 1922	25-150	8950	2	Wisc.	6-5 1/2 x 6 1/2	Gas.	16	Waltis.....K	15-25	....	4	Own	4-4 1/2 x 5 1/2	G,K	3	
Case.....	12-20	1050	4	Own	4-4 1/2 x 5	G,K,D	2-3	Lombard. 1922	50	5300	2	Wisc.	4-4 1/2 x 6 1/2	Gas.	6-10	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	Ker.	3	
Case.....	15-27	1320	4	Own	4-4 1/2 x 6	G,K,D	3-4	MerryCar 1922	2	210	2	Evin	1-2 1/2 x 2 1/2	Gas.	....	Wetmore 21-22	12-25	1185	4	Wauk	4-4 x 5 1/2	G,K	3	
Case.....	22-40	2550	4	Own	4-5 1/2 x 6 1/2	G,K,D	4-5	Minne.....All-P	12-25	800	4	Own	4-4 1/2 x 6 1/2	G or K	3	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	Gas.	2	
Case.....	40-72	5200	4	Own	7 x 8	G,K,D	8-10	Minne. Med.D	22-44	2650	4	Own	4-6 x 7	G or K	5-6	Wichita.....T	15-30	2000	4	Beav.	4-4 1/2 x 6 1/2	G,K,D	3-4	
Caterpillar T35	15	....	2	Own	4-4 x 5 1/2	Gas.	3	Minne. Heavy D	35-70	3850	4	Own	4-7 1/2 x 9	G or K	8-9	Wisconsin.....E	16-30	1850	4	Clim.	4-5 x 6 1/2	G or K	3	
Caterpillar ST	25	....	2	Own	4-4 x 6	Gas.	4	Mohawk. 1922	8-16	650	2	Light	4-3 1/2 x 4 1/2	K or G	1-2	Wisconsin.....F	20-40	2050	4	Wauk	4-5 x 6 1/2	G or K	4	
Caterpillar 10T	40	....	2	Own	4-6 1/2 x 7	Gas.	6	Moline Univ D	9-18	650	2	Own	4-3 1/2 x 5	Gas.	2-3	Wisconsin.....H	22-40	2550	4	Clim.	4-5 1/2 x 7	G or K	4-6	
Centrac.....	5-2 1/2	345	2	N Way	2-4 1/2 x 4 1/2	GorK	1	Moline Orch.	9-18	....	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....12-20	12-20	2400	2	Wauk.	4-4 1/2 x 6 1/2	G,K,D	3	
Centrac.....F	9-16	895	2	Own	4-3 1/2 x 4 1/2	G,K,D	2	*Monarch.....	20-30	3500	2	Beav.	4-4 1/2 x 6	G,K,D	4	Yuba.....15-25	15-25	2750	2	Wisc.	4-4 1/2 x 6	G,K,D	3	
Centrac.....W	12-20	1315	2	Own	4-4 x 5 1/2	G,K,D	2-3	Motor Macult,	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	....	Yuba.....20-35	20-35	3900	2	Wisc.	4-5 1/2 x 7	G,K,D	4	
																	Yuba.....25-40	25-40	4250	2	Wisc.	4-5 1/2 x 7	G,K,D	4
																	*Yuba.....	25-40	4750	2	Yuba	4-6 1/2 x 7	D	
Dakota.....4	15-27	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	NB.....1	3-6	375	4	Own	2-3 1/2 x 4	Gas.	1									
Dill.....D	20	2380	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	Nichols-Shep.	20-42	2650	4	Own	2-8 x 10	G or K	3-6	ABBREVIATIONS:	G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 11 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. LeR.—Leroy. Midw.—Midwest. Evin.—Evinrude. Herc.—Hercules. LeR.—Leroy. Midw.—Midwest. Evin.—Evinrude. Herc.—H							

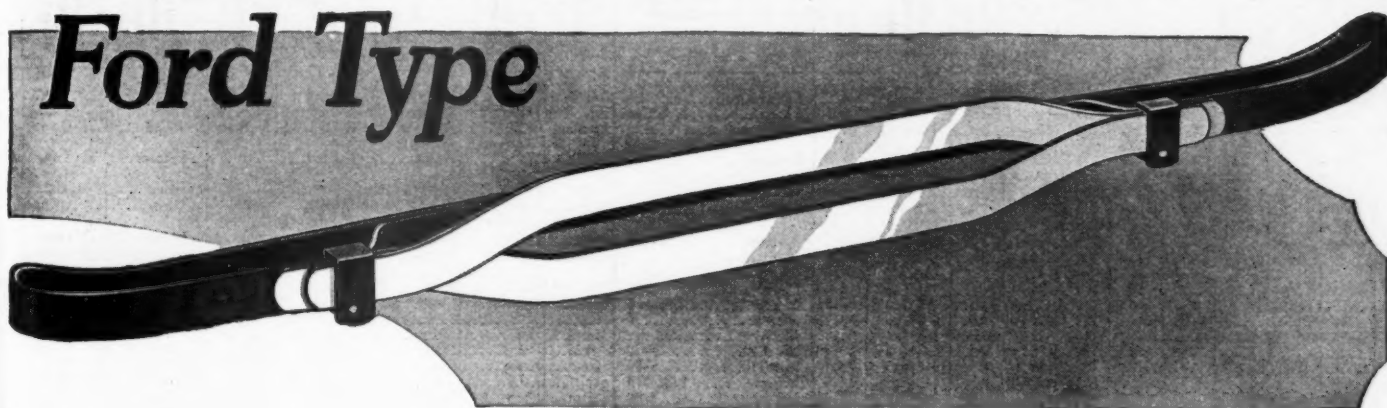
## Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (S.A.E.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle Type and Make	† Gear Ratio
2-Door	5-Door	7-Door	Sport	Coupe	Sedan														
\$1995c	\$4500c	\$4500c	\$1885c		\$6500	136	33x5	Cont.	6-3 1/2 x 5 1/2	31.5	Ambassador..... R	Strom.	West.	Bosch.	m-d B-L	B-L	f Norwalk	F 1 1/2	4.45
1745	1745	1850	1885c		2485	127	33x4 1/2	H-S	6-3 1/2 x 5	29.40	American..... D-66	Strom.	G-D	A-K	s-p B&B	B & B	m Hartford	F 1 1/2	4.50
1495	1495	1595	1595c		\$1450c	114	32x4	Cont.	6-3 1/2 x 4 1/2	23.44	Anderson..... Aluminum 6	Strom.	West.	West.	s-p B&B	B & B	m Hartford	F 1 1/2	4.50
1785p			1945c		1995d	120	33x4	Cont.	6-3 1/2 x 4 1/2	27.3	Anderson..... Series 40	Rayfield.	Remy.	Remy.	s-p B&B	Durst.	f Sneed	1 1/2 F Own	4.50
2620	2620	2645		3625	3695	130	34x4 1/2	Own.	8-3 1/2 x 5	33.80	Apperson..... 8-21-S	Johnson.	Bijur.	Remy.	m-d Own	Own	m Sterl.	1 1/2 F Own	4.25
1475	1475	1545n	1395n	2275	2345	121	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Auburn..... 6-51	Strom.	Remy.	Remy.	s-p B&B	G-L	m Univers.	1 1/2 F Sale	4.75
1305	1305			1850d		118	32x4	Cont.	6-3 1/2 x 4 1/2	23.44	Barley.....	Delco.	Delco.	Delco.	s-p B&B	Fuller.	f M&E	4 Col.	4.67
1800	1800			2400	2500	121	32x4	Cont.	6-3 1/2 x 4 1/2	25.35	Bay State.....	Strom.	Delco.	Delco.	s-p B&B	Warner.	m Spicer	1 1/2 F Col.	4.50
2950	2950c			3950	3950	121	32x4	Buda.	4-3 1/2 x 5 1/2	22.50	Biddle..... B1 & B5	Zenith.	G-D	Simms.	s-p Warner	Warner.	m Spicer	1 1/2 F Std.	3.92
5000	5000			7000	7000	125	32x4 1/2	Own.	4-4 x 5 1/2	25.60	Brewster.....	Zenith.	USL	Bosch.	c Own	Own	F Own	1 1/2 F Own	4.66
865	865	725g		1175	1395	109	31x4	Own.	4-4 1/2 x 4 1/2	18.23	Buick..... 1923-34-5-6-7-38	Marvel.	Delco.	Delco.	m-d Own	Own	m Own	1 1/2 F Own	4.66
1175	1195	975c		1935	1985	118	33x4	Own.	6-3 1/2 x 4 1/2	27.34	Buick..... 1923-41-4-5-47	Marvel.	Delco.	Delco.	m-d Own	Own	m Own	1 1/2 F Own	4.60
1435		1435	1625a	1895	2151	124	34x4 1/2	Own.	6-3 1/2 x 4 1/2	27.34	Buick..... 1923-48-9-50-4-55	Marvel.	Delco.	Delco.	m-d Own	Own	m Own	1 1/2 F Own	4.90
3100	3150	3150		3875a	4100	132	33x5	Own.	8-3 1/2 x 5 1/2	31.25	Cadillac..... 61	Own.	Delco.	Delco.	m-d Own	Own	m Spicer	F Tim.	4.50
1750	1790			2550	2690	122	32x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Case..... X	Rayfield.	Delco.	Delco.	m-d Own	Own	f Sneed	1 1/2 F Col.	5.25
2200	2200	2250		2850	3250	129	34x4 1/2	Cont.	6-3 1/2 x 5 1/2	31.54	Case..... W	Rayfield.	Delco.	Delco.	m-d Own	Own	f Arvae	1 1/2 F Col.	4.45
1185	1185			1595	2295	117	32x4	Own.	6-3 1/2 x 4 1/2	25.35	Chalmers..... 1922	Strom.	A-L	Remy.	m-d Own	Own	m Spicer	1 1/2 F Adams	5.13
1345	1345			2095d	3085f	122	32x4	Own.	6-3 1/2 x 4 1/2	25.35	Chalmers..... 1922	Strom.	A-L	Remy.	m-d Own	Own	m Hardy	1 1/2 F Adams	5.13
1495c	1495c	1645	1595a	1995c	2295d	123	33x4	Own.	6-3 1/2 x 5	29.40	Chandler..... Six	Rayfield.	Bosch.	Bosch.	s-p B&B	Own	f Own	1 1/2 F Own	4.45
510	525	425g		840c	880	102	30x3 1/2	Own.	4-3 1/2 x 4	21.53	Chevrolet..... Superior	Zenith.	A-L	Remy.	c Own	Own	m Own	1 1/2 F Own	3.66
1085	1095		1260	1495	1585	112	32x4	Own.	6-3 1/2 x 4 1/2	22.50	Cleveland..... 41	Strom.	Bosch.	Bosch.	s-p Own	Own	m Mech.	1 1/2 F Own	4.45
2685		2685	2685c	3285b	3285b	127 1/2	33x5	Nort.	8-3 1/2 x 5 1/2	39.20	Cole..... 890	Johnson.	Delco.	Delco.	c North.	North.	m Spicer	F Col.	4.46
1475	1475		1475c	1925c	1995d	115	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Columbia..... Elite	Strom.	A-L	A-K	s-p B&B	Durst.	m Spicer	1 1/2 F Tim.	4.45
945	985			1395d		115	31x4	Cont.	6-3 1/2 x 4 1/2	23.44	Columbia..... Light Six	Strom.	A-L	A-L	s-p B&B	Durst.	m Spicer	1 1/2 F Tim.	4.45
1985	1985	3085f		2095d	3085f	125	33x4 1/2	Cont.	6-3 1/2 x 5 1/2	29.40	Comet..... C-53	Strom.	Wagner.	Wagner.	s-p B&B	Muncie.	m Arvae	1 1/2 F Col.	4.45
1395	1395		1495b	2065b	2165d	116	32x4	Falls.	6-3 1/2 x 4 1/2	23.44	Courier.....	Till.	Bijur.	A-K	s-p B&B	Muncie.	f Norwalk	1 1/2 F Col.	5.00
3000	3000	3000		4500		122 1/2	32x4	Cont.	6-3 1/2 x 5 1/2	31.54	Crawford..... 22-6-60	Strom.	West.	Bosch.	m-d B-L	B-L	m Spicer	1 1/2 F Tim.	4.45
4350b	4350c	4350		5250	6000	132	33x5	Own.	8-3 1/2 x 5 1/2	31.54	Crawford-Dagmar..... 6-60	Zenith.	West.	Bosch.	m-d B-L	B-L	m Spicer	1 1/2 F Tim.	4.45
1295	1295	1495		1795	1795	114	31x4	Cont.	8-3 1/2 x 5	45.00	Cunningham..... V	Strom.	Delco.	Delco.	m-d Own	Own	f Sneed	F Tim.	4.23
1595	1595	1595		2095	2095	132	33x5	Own.	8-3 1/2 x 5 1/2	39.20	Daniels..... D-19	Zenith.	Delco.	Delco.	m-d Own	Own	m Spicer	F Tim.	4.45
1775	1775	1295c	1245	1515	1595	112	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Davis..... 71	Strom.	Delco.	Delco.	s-p B&B	Warner.	m Peters	1 1/2 F Tim.	5.10
850	880			980b	1195d	114	32x4	Own.	4-3 1/2 x 5	19.60	Dixie Flyer..... H-S-70	Strom.	Dyneto.	Eise.	s-p B&B	G-L	f Hardy	F Peru	4.75
3350c	3950c	3950		4985c	5750f	132	33x5	Own.	6-4 x 5	38.40	Dodge Brothers.....	Stewart.	N.E.	N.E.	m-d Own	Own	m Own	1 1/2 F Tim.	4.16
885	885	1015a	1265	1385	1585	108	31x4	D-Ly.	4-3 1/2 x 5	19.60	Dorris..... 6-80	Strom.	West.	Bosch.	m-d Own	Warner.	m Spicer	F Tim.	4.23
1275	1275	1650	1975	1015k	1095k	108	31x4	D-Ly.	4-3 1/2 x 5	19.60	Dort..... 19-14	Carter.	Bosch.	Conn.	m-d Det.	Own	m Mech.	1 1/2 F Flint.	4.66
6500	6500	6750		7800	7800	134	33x5	Own.	8-2 1/2 x 5	26.45	Driggs.....	Zenith.	Bosch.	Bosch.	s-p Hoos.	Mech.	m Spicer	1 1/2 F Own	4.75
3000	3200			3300	4000	124	32x4 1/2	Own.	4-3 1/2 x 5 1/2	24.81	Duesenberg..... Straight 8	Strom.	Delco.	Delco.	s-p Own	Own	f Own	1 1/2 F Own	4.81
890	890	1315	1365	109	31x4	Cont.	4-3 1/2 x 4 1/2	24.03	Du Pont..... A-22	Y&T.	West.	Eise.	m-d B-L	B-L	m Spicer	F Col.	4.50		
1600	1650	2250	2100	123 1/2	32x4 1/2	Anst.	6-3 1/2 x 4 1/2	25.35	Durant..... A-22	Till.	A-L	A-L	s-p B-L	Own	m Spicer	1 1/2 F Adams	4.30		
1485	1095	950g	1395c	1795	112	32x4	Own.	4-3 1/2 x 5 1/2	18.91	Durant..... B-22	Rayfield.	A-L	A-L	s-p Anst.	Warner.	m Spicer	1 1/2 F Tim.	5.15	
1095	1095		1095	1315	118	33x4	Lye.	4-3 1/2 x 5	19.60	Earl..... 40	Strom.	Delco.	Delco.	s-p B&B	Warner.	m Peters	1 1/2 F Tim.	5.15	
1395	1395		1395	1975	2065	118	33x4	Cont.	6-3 1/2 x 4 1/2	27.34	Elcar..... K-4	Strom.	Delco.	Delco.	s-p B&B	Muncie.	m Peters	1 1/2 F Salis.	4.50
1125c	1125	1165	1685	1615	118	33x4	Falls.	6-3 1/2 x 4 1/2	23.44	Elcar..... 7-R	Strom.	Delco.	Delco.	m-d Warner	Warner.	m Spicer	1 1/2 F Salis.	4.50	
1015	1015	1145k	1895	108 1/2	32x4	Own.	4-3 1/2 x 5	18.23	Elgin..... K-1	Strom.	West.	Wagner.	m-d Own	Mech.	m Mech.	1 1/2 F Col.	4.66		
260r	268a	235g		530	595	100	30x3 1/2	Own.	4-3 1/2 x 4	22.50	Essex.....	Own.	Bosch.	Bosch.	m-d Own	Own	m Spicer	1 1/2 F Own	4.66
3900	3900	4900	4900	725	132	32x4 1/2	Own.	6-3 1/2 x 5	27.34	Ford..... T	Own.	Own.	Own.	m-d Own	Own	m Own	1 1/2 F Own	3.63	
1900	1950	1750g	2750	2850	115	32x4	Own.	6-3 1/2 x 4	25.35	Fox..... 7F	Zenith.	West.	Bosch.	m-d B-L	B-L	m Spicer	1 1/2 F Tim.	1.45	
895	895	1095k	1345d	112	32x4	Lye.	4-3 1/2 x 5	29.60	Franklin..... 10	Own.	N.E.	A-K	s-p B&B	Own	m Spicer	1 1/2 F Own	4.73		
1385	1385	1895	1915	116	32x4	Own.	4-3 1/2 x 5	23.44	Gardner..... T-R & G	Carter.	West.	West.	s-p B&B	Mech.	m Mech.	1 1/2 F Flint.	4.80		
490	490	760	700	100	30x3 1/2	Own.	4-3 1/2 x 4	21.03	Grant.....	Strom.	Bijur.	A-K	s-p B&B	Durst.	m Spicer	1 1/2 F Col.	1.66		
2475	2475c	3250	3475	120	32x4 1/2	Weid.	4-3 1/2 x 5 1/2	22.50	Gray.....	Strom.	West.	West.	m-d Own	Detr.	m Mech.	1 1/2 F Tim.	3.90		
905	905	2650	3450	3450	125	32x4 1/2	Own.	4-4 1/2 x 4 1/2	27.23	H.C.S..... Series 4	Strom.	Delco.	Delco.	m-d B-L	B-L	m Spicer	1 1/2 F Own	4.90	
1595	1595	2475c	2585	121	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	Handley-Knight.....	Till.	A-L	A-L	s-p Warner	Warner.	m Spicer	1 1/2 F Tim.	4.90		
1345	1345	1950	1950	115	32x4	H-S	4-3 1/2 x 5	19.60	Hanson..... 30	Marvel.	Delco.	Delco.	s-p B&B	Detr.	m Spicer	1 1/2 F Tim.	4.90		
2395	2395c	2395	3395	132	33x5	Own.	6-3 1/2 x 5 1/2	29.40	Hanson..... 60	Marvel.	Delco.	Delco.	s-p B&B	Detr.	m Spicer	1 1/2 F Tim.	4.90		
1545	1495	1895a	2090	2395	121	32x4 1/2	Own.	6-3 1/2 x 5	29.40	Hatfield..... A-42	Zenith.	Dyneto.	Conn.	s-p B&B	G-L	m Spicer	1 1/2 F Col.	4.66	
2500c	2500	2395p	3600f	126	34x4 1/2	Own.	6-3 1/2 x 4 1/2	29.40	Haynes..... 75	Strom.	L-N	King.	s-p Warner	Own	m Univers.	1 1/2 F Own	4.60		
1525c	1525c	2570c	3300c	126	34x4 1/2	Own.	6-3 1/2 x 5	29.40	Haynes..... 55	Rayfield.	L-N	King.	s-p Warner	Own	m Univers.	1 1/2 F Own	4.11		
1395																			



# WEED SAFETY BUMPER

## Ford Type



### *Fits All Models With Any Type of Shock Absorbers*

Like other dealers you have lost Ford bumper business in the past because your customers wanted shock absorbers and the bumper wouldn't fit with the shock absorbers.

But here is a Ford bumper that *fits front and rear with any shock absorber that has yet been designed*, is easily attached without drilling any holes, and does not interfere with any working part of the automobile.

The WEED SAFETY BUMPER is made of 1½-inch spring steel, hardened in oil and tempered. So designed and constructed that it will absorb the heaviest smash as effectively as the every-day bumps that crumple mudguards, break headlights, crush radiators. No other bumper can go over, under, or in between its wide buffers. It stops them all.

The WEED SAFETY BUMPER is beautiful, strong and rigid; does not vibrate; and adds dignity to the car.

There are approximately 5,200,000 Ford cars without bumpers. This means a market for 10,400,000 bumpers—a gross business of \$150,800,000. It represents a profit of \$60,320,000 that is still without takers. Add to this the fact that Ford dealers sell more than half the cars of all makes sold in this country, thus creating an additional market for 250,000 bumpers every month.

Get your share of this bumper business and "bumper" profits by stocking *Weed Safety Bumpers for Ford cars* now.

Sell every Ford owner in your locality. They want this bumper—it sells on sight!

*Order from your jobber today*

**LIST PRICES** { Front Bumper—Black Enamel, \$13.00; with Nickel-Plated Front Bars, \$14.00  
 { Rear Bumper—Black Enamel, \$14.00; with Nickel-Plated Front Bars, \$15.00

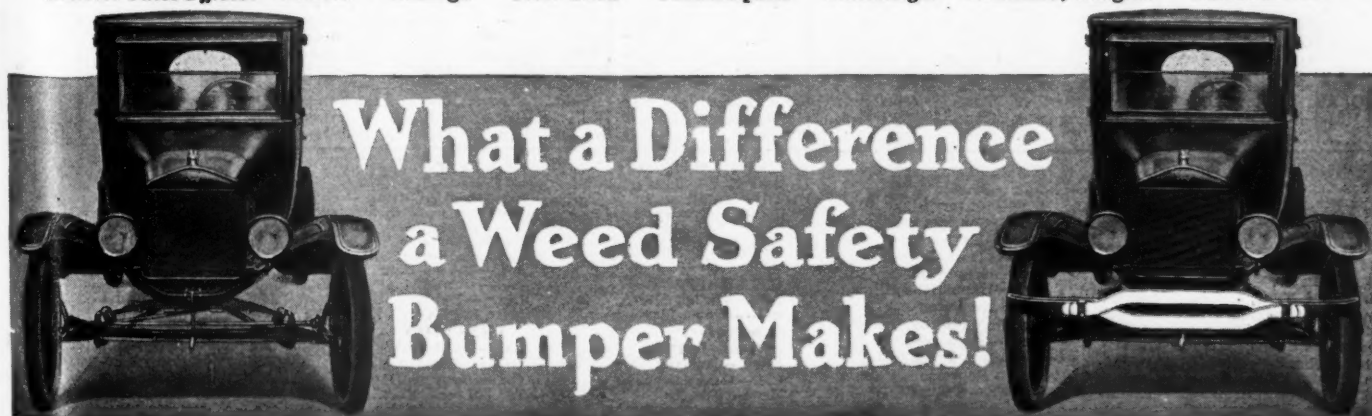


## AMERICAN CHAIN COMPANY, INCORPORATED

Bridgeport, Connecticut

In Canada: DOMINION CHAIN COMPANY, LIMITED, Niagara Falls, Ontario

District Sales Offices: Boston Chicago New York Philadelphia Pittsburgh Portland, Oregon San Francisco



## What a Difference a Weed Safety Bumper Makes!

## Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (S.A.E.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	Gear Ratio
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan														
\$2985	\$4090c	\$4090		\$5500	\$5500	132	33x5	Own.	8-3 1/2 x 5 1/2	33.80	LaFayette.	Johnson.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Own.	4.58
5500	5500	5500		5500	5500	134	32x4 1/2	Own.	6-3 1/2 x 5 1/2	33.75	Leach.	Rayfield.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Tim.	
1695	1695	1795	\$2045d	2345c	2545d	123	32x4 1/2	Anst.	6-3 1/2 x 4 1/2	25.35	Lexington.	Rayfield.	G-D.	Conn.	m-d Anst.	Warner.	f Sneed.	3/4 F Own.	5.10
1575	1395		1575	2085	2245	117	32x4	Own.	6-3 1/2 x 5	23.44	Liberty.	Strom.	Wagner.	Wagner.	s-p B&B.	Det.	m Spicer.	1/2 F Tim.	4.80
				1695k															
3800	3800c	3800		4400d	4700d	136	33x5	Own.	8-3 1/2 x 5	36.45	Lincoln.	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim.	4.58
	7600c	7600		10500	11000	142	35x5	Own.	6-4 1/2 x 5 1/2	48.60	Locomobile.	Ball&B.	West.	Delco.	m-d Own.	Own.	m Own.	F Own.	3.50
3385	3185c	3185		3085	4385	136	32x4 1/2	Own.	6-3 1/2 x 5 1/2	33.75	Marmen.	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/4 F Own.	3.75
885	885			1235	1335	109	31x4	Own.	4-3 1/2 x 4 1/2	21.03	Maxwell.	Stewart.	A-L.	Simms.	e Own.	Own.	m Spicer.	3/4 F Own.	4.56
6300	6300c	6300		7500	7500	140	33x5	Own.	6-4 1/2 x 6	48.60	McFarlan.	Rayfield.	West.	Split.	s-p B&B.	B-L.	m Peters.	F Tim.	3.60
3950	3950c	3950c		4850	5250	132	32x4 1/2	Own.	4-3 1/2 x 6 1/2	22.50	Mercer.	Ball&B.	West.	Eise.	m-d Own.	Own.	m Spicer.	F Own.	3.87
1895	1895	3750		5000	5000	132	32x4 1/2	Own.	6-3 1/2 x 5	23.75	Mercer.	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	f Sneed.	F Col.	4.60
1490b	1590	1850c	2050c	2275d		119	32x4	Cont.	6-3 1/2 x 4 1/2	25.35	Merit.	Strom.	Delco.	Delco.	s-p B&B.	Own.	m Own.	F Own.	4.42
		1690		127	127	120	32x4 1/2	Own.	6-3 1/2 x 5	29.40	Mitchell.	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
950	950			115	115	115	32x4 1/2	Own.	4-3 1/2 x 4 1/2	16.90	Mitchell.	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
1295	1195	p1445d	1885c	1585c	1695	115	31x4	Cont.	6-3 1/2 x 4 1/2	23.44	Monroe.	Zenith.	A-L.	Conn.	m-d Own.	Mech.	m Univers.	3/4 F Own.	5.30
1785	1785	1785	1885	2785	2785f	128	33x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Monroe.	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer.	1/2 F Tim.	4.80
				2485c															
1210	1240		1395c	2040d	121	33x4	Own.	6-3 1/2 x 5	25.35	Nash.	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1/2 F Own.	4.50	
915	935		1390	1890c	127	34x4 1/2	Own.	6-3 1/2 x 5	25.35	Nash.	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1/2 F Own.	4.50	
				1185b	112	33x4	Own.	4-3 1/2 x 5	18.23	Nash Four.	Schebler.	Delco.	Delco.	s-p B&B.	Own.	m Own.	1/2 F Own.	4.88	
2475b	2475c	2375		3250c	3825f	130	32x4 1/2	Own.	6-3 1/2 x 5 1/2	29.40	National.	Rayfield.	West.	Delco.	s-p B&B.	B-L.	m Arvac.	F Col.	4.08
		3150		3725c															
2500	2500c	2600c		3500d	128	32x4 1/2	Cont.	6-3 1/2 x 4 1/2	25.35	Nema.	Claud.	Delco.	Delco.	s-p B&B.	Det.	m Spicer.	1/2 F Tim.	4.45	
3000	3100c	3200c		5500	128	32x4 1/2	Bea.	6-3 1/2 x 5 1/2	29.40	Nema.	Zenith.	Delco.	Delco.	s-p B&B.	Det.	f Spicer.	1/2 F Tim.	4.45	
	1035				116	32x3 1/2	Lyc.	4-3 1/2 x 5	19.60	Norwalk.	Zenith.	Dyneto.	Delco.	s-p B&B.	G-L.	m Univers.	3/4 F Col.	5.00	
975	995	795g	1165c	1445d	1545	115	32x4	Own.	6-2 1/2 x 4 1/2	18.99	Oakland.	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.	F Own.	4.33
				1185a															
3750c	3750	3850	3750c	4500c	4800f	134	33x5	Cont.	6-3 1/2 x 5 1/2	31.51	Ogren.	Rayfield.	Bosch.	Bosch.	m-d B-L.	B-L.	m Own.	F Col.	4.00
965	975	1350d	1075	1475	1595	115	32x4	Own.	4-3 1/2 x 5 1/2	21.86	Oldsmobile.	Zenith.	A-L.	Remy.	s-p B&B.	Warner.	m Own.	3/4 F Own.	4.33
1735c	1850c	1735			122	33x4 1/2	Own.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.	Ball&B.	Delco.	Delco.	e Own.	Warner.	m Own.	3/4 F Own.	4.93	
1625b	1375		1675	1875	2025	115	32x4	Own.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.	Johnson.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer.	1/2 F Own.	5.10
525	525		425g	795	875	100	30x3 1/2	Own.	4-3 1/2 x 4	18.23	Overland.	Till.	A-L.	Conn.	s-p B&B.	Own.	m Own.	1/2 F Own.	4.50
2485	2485	2250g		3175	3275	126	33x4 1/2	Own.	6-3 1/2 x 5	27.34	Packard.	Own.	A-K.	Delco.	m-d Own.	Own.	f Spicer.	1/2 F Own.	4.30
	2350g	2685		3525	3525	133	33x4 1/2	Own.	6-3 1/2 x 5	27.34	Packard.	Own.	A-K.	Delco.	m-d Own.	Own.	f Spicer.	1/2 F Own.	4.66
3850	3850	3850		5240	5400	136	35x5	Own.	12-3x 5	43.20	Packard.	Own.	Bijur.	Delco.	m-d Own.	Own.	m Spicer.	1/2 F Own.	4.36
1465	1465	1290g		1995	2245	119	32x4	Own.	6-3 1/2 x 5	25.35	Paige.	Strom.	Remy.	A-K.	s-p Long.	Own.	m Univers.	3/4 F Salis.	4.75
2495b	1390	1425	2245	3100	3155	131	33x4 1/2	Cont.	6-3 1/2 x 5	33.75	Paige.	Rayfield.	Remy.	A-K.	s-p Long.	Warner.	m Mech.	1/2 F Tim.	4.60
	2990c	2990		3300a	3990d	128	33x5	Own.	8-3 1/2 x 5	33.80	Petersen.	Strom.	Delco.	Delco.	s-p B&B.	Durst.	m Hartford.	1/2 F Std.	4.50
				3400c	4090f						Peerless.	Ball&B.	Delco.	Delco.	m-d Own.	Own.	M Spicer.	3/4 F Tim.	4.90
5250	5250c	5250		6800	6900	138	33x5	Own.	6-4 x 5 1/2	38.40	Pierce-Arrow.	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	1/2 F Own.	3.93
				700															
2050	2000	2050		2950	3000	126	32x4 1/2	H-S.	6-3 1/2 x 5	25.35	Pilot.	Till.	Bijur.	Conn.	s-p B&B.	Muncie.	m Hartford.	3/4 F Col.	4.33
3150	3100c	3250		4300	5100	126 1/2	32x4 1/2	Own.	6-3 1/2 x 5 1/2	27.34	Premier.	Johnson.	Delco.	Delco.	s-p B&B.	Own.	m Spicer.	3/4 F Own.	4.58
1095	1095			1750	1825	117	32x4	Falls.	6-3 1/2 x 4 1/2	23.44	Premcar.	Strom.	Wagner.	Wagner.	s-p B&B.	Mech.	m Spicer.	1/2 F Own.	4.66
2475	2475c	2475		2385	2475	116	32x4	Own.	4-3 1/2 x 5	22.50	R & V Knight.	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	F Salis.	4.75
1595	1615	1485	1745	3015	3105	127	32x4 1/2	Own.	6-3 1/2 x 5 1/2	29.40	R & V Knight.	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	1/2 F Tim.	4.90
3200	3200	3200		2435f	3200	120	33x4	Own.	6-3 1/2 x 5	24.34	Reo.	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m Own.	1/2 F Own.	4.70
	1485			4000	4000	131	32x4 1/2	Dues.	4-4 1/2 x 6	28.90	ReVer.	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	3/4 F Std.	4.00
2685	2485c	2685		1885	1985	117	32x4	Own.	6-3 1/2 x 4 1/2	23.44	Rickenbacker.	Strom.	Simms.	A-K.	e Own.	Own.	m Univers.	3/4 F Own.	4.88
3785	3485	3650c	3650c	3585	3585	128	32x4 1/2	Cont.	6-3 1/2 x 5 1/2	29.40	Roamer.	Strom.	Bijur.	Boesch.	s-p G-L.	B-L.	f Sneed.	1/2 F Tim.	4.88
				4650c	4650c	128	32x4 1/2	Dues.	4-4 1/2 x 6	28.90	Roamer.	Strom.	Bijur.	Split.	m-d B-L.	B-L.	f Sneed.	1/2 F Tim.	3.77
											Rolls-Royce.	Strom.	Bijur.	Bijur.	c Own.	Own.	m Own.	F Own.	3.25
1195	1195		1795	1795	112	32x4	Own.	4-3 1/2 x 5	19.60	Saxon.	Strom.	Wagner.	Wagner.	s-p Det.	Cov.	m Peters.	3/4 F Own.	4.75	
1645	1645		2645	2645	118	33x4	Cont.	6-3 1/2 x 4 1/2	25.35	Sayers Six.	Strom.	Delco.	Delco.	s-p B&B.	G-L.	m Arvac.	1/2 F Std.	4.75	
875	875				108	30x3 1/2	Lyc.	4-3 1/2 x 5	19.60	Seneca.	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Univers.	F	4.75	
1095	1095				112	31x4	Lyc.	4-3 1/2 x 5	19.60	Seneca.	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Univers.	F	4.50	
980	980		1685	1685	114	32x4	Supr.	4-3 1/2 x 5	18.23	Sperling.	Zenith.	Bijur.	Delco.	s-p B&B.	Warner.	m Hartford.	3/4 F Peru.		
2150		2395	2395	2750	3200	127	34x4 1/2	Own.	8-3 1/2 x 5	33.80	Standard.	Zenith.	West.	Split.	s-p B&B.	G-L.	m Arvac.	1/2 F Tim.	4.45
2750	2750	2750	2425g	3950c	3985f	130	32x4 1/2	Own.	2-4 x 5	25.35	Stanley.	Strom.	Bijur.	None.	None.	None.	None.	1/2 F Own.	1.50
1765	1765			2750		118	33x4	Cont.	6-3 1/2 x 4 1/2	25.35	Stanwood Six.	Strom.	West.	A-K.	s-p B&B.	G-L.	m Peters.	1/2 F Std.	4.50
319r	348a	285g		680	645	102	30x3 1/2	Cont.	4-3 1/2 x 4 1/2	15.63	Star.	Till.	A-L.	A-L.	s-p	Spicer.	1/2 F Own.	4.87	
2250	2250	2150		3150	3450	125	34x4 1/2	Own.	4-3 1/2 x 5 1/2	22.50	Stearns-K								